

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

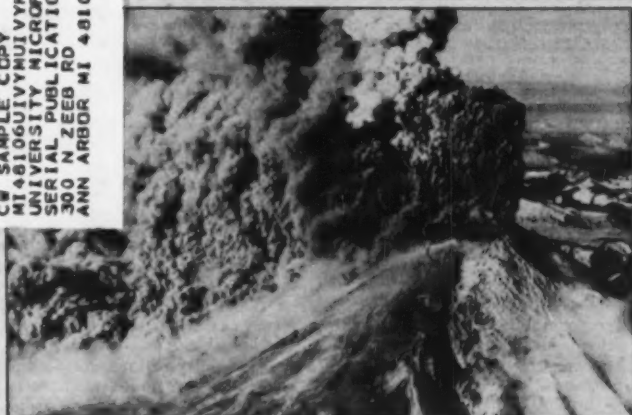
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NEWSPAPER



Wide World Photos

Mount St. Helens erupts, spewing black ash and smoke skyward from the 9,677-foot peak and threatening computing sites across the state.

Washington State DP Sites Survive Volcanic Fallout

By Jeffery Beeler

CW West Coast Bureau

Each of Washington state government's five main computing centers has resumed normal operations since the explosive Mount St. Helens volcano blew its stack on May 18.

But clouds of gritty, computer-threatening volcanic ash did bring all five sites to a standstill for at least several hours, and the danger of even more serious disruptions still looms in the future, according to Washington state's chief DP coordinator, Galen Schmidtke.

On the whole, Mount St. Helens' recent outbursts have hampered the state government's computing operations much less seriously than many local DP administrators might originally have predicted, Schmidtke said. Although the state's computing centers ground to a halt late last month for as

long as 46 consecutive hours, most of the interruptions came during week-ends, the Memorial Day holiday or other slack activity periods.

Nor have the volcanic eruptions damaged major hardware at any of the five sites, Schmidtke continued. For DPs at least, Mount St. Helens has restricted its attacks thus far to computer room air conditioning systems and to a few electric power substa-

(Continued on Page 8)

Managers Urged To Aim for Top

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Many future chief executive officers will necessarily come from the information-manager ranks because information is "the key to productivity and bottom-line progress within business."

Having said that, Dun & Bradstreet Chairman James J. Crenner told an audience here last week that information managers must carve out their own niche in top management, and they definitely have the tool to do it — information.

Delivering the keynote address at the National Information Conference and Exposition last Wednesday, Crenner said the person responsible for gathering

(Continued on Page 6)

By Ann Dooley
CW Staff

PHILADELPHIA — While both white- and blue-collar workers all over the country are facing massive layoffs, DP professionals are still in demand and receiving top salaries, according to a recently released mid-1980 survey of new hires by Fox-Morris Personnel Consultants, Inc., based here.

The overall demand for DP personnel rose 18.7% above that of last year. That number is a scant 2.5% lower than the demand increase recorded in mid-1979 — an acknowledged banner year, according to Fox-Morris.

Accompanying salaries also remain high. Overall, salaries increased 12.4%, compared with an increase of 12.6% in mid-1979, the survey showed.

All figures were drawn from an annual study of job openings conducted by Fox-Morris and its affiliates in National Personnel Consultants. This year, more than 1,000 vendors and user firms nationwide and spanning all types of businesses were surveyed, Fox-Morris said.

However, the figures should not necessarily be considered a complete overview of DP jobs since each year only those firms doing business with these personnel agencies were polled.

Automation Viewed Threat to Workers

By Bruce Hoard

CW Staff

ANAHEIM, Calif. — Unrestrained automation is an insidious juggernaut that threatens to undermine employment and strip workers of their identity, panelists said at the National Computer Conference here recently.

Judith McCullough, a former clerk now associated with Working Women-Los Angeles, said office workers are wondering if word processing and other office automation machinery will replace them by 1990.

"That could be reality if present trends continue," she said. She cited instances in which banks and insurance companies have eliminated or changed secretarial positions with the end result being either the loss of jobs or the creation of undiversified, one-task positions.

One office worker who enjoyed using word processors was distraught because she was expected to perform more work and instruct trainees, but without a raise in pay, McCullough claimed.

High Stakes for Women

Women have a particularly high stake in the battle against unchecked office automation because 90% of the jobs to be changed by it are currently

filled by women, she said.

"It is important that we, as the women doing the work, evaluate automated offices," she said.

The advent of automated offices means harassment for office workers in the form of rigid guidelines in areas such as output speed and error rate, she said, adding, "the overall main thrust of automation is to centralize and control office workers like they have never been controlled before."

Although women will protest unwarranted changes in the office structure during the '80s, the battle will be a difficult one, McCullough said, quoting an IBM executive as saying, "They will respond when we break their arms, and we're in the twisting stage now."

Productivity Crisis

Harley Shaiken, a machinist and author who advised the United Auto Workers (UAW) in their negotiations with the Ford Motor Co., said the productivity crisis will be "on center stage" in the '80s.

In order to combat that crisis, industry will turn to powerful forms of automation in the shape of computers in general and microprocessors in particular, he said.

(Continued on Page 4)

Survey Finds DPs Still in Demand

According to the survey, applications programmers are at the top of employers' most wanted lists, showing a 33.3% increase in demand over the year-ago period. However, although that figure is impressive, it is off by

10.7% from the 44% demand increase recorded a year earlier.

A similar decrease in demand was recorded in six other categories. Only three — management information ser-

(Continued on Page 6)

Mid-1980 Salaries

VARIOUS TYPICAL RANGE OF JOB TITLES	AVG. YRS. EXPERIENCE	AVG. U.S. SALARIES* (\$ avg. highs)	% SALARY CHANGE FROM MID-'79
MIS Director	14.3 yrs.	\$41,450 (\$51,600)	+10.9%
Data Base Manager	8.9 yrs.	\$33,800 (\$40,000)	+21.0%
Systems/Software Programmer Managers	6.8 yrs.	\$33,150 (\$41,000)	+17.1%
Software Programmer	4.1 yrs.	\$24,900 (\$29,000)	+15.0%
EDP Auditors	3.1 yrs.	\$24,600 (\$28,750)	+15.1%
Telecomm. Personnel	2.6 yrs.	\$24,500 (\$28,500)	+12.5%
Systems Analyst	5.6 yrs.	\$25,800 (\$28,000)	+15.5%
Applications Programmer	3.5 yrs.	\$21,750 (\$26,000)	+16.6%
Entry MBA Grad	0 yrs.	\$19,100 (\$20,700)	+16.1%
Entry B.S. Computer Science	0 yrs.	\$16,050 (\$18,300)	+17.5%

*New Hires

Source: Fox-Morris Mid-'80 U.S. Data Processing Job/Salary Survey



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But User Eye Strain Incidence High CRT Radiation Not Harmful: Niosh

By Ann Dooley

CW Staff

SAN FRANCISCO — CRT terminal operators are apparently safe from radiation dangers since emissions from CRTs are too low to be hazardous to employee health, a study by the National Institute for Occupational Safety and Health (Niosh) has concluded.

But the Niosh study found CRT operators reporting a "significantly higher percentage" of eye strain, tearing, itching of the eyes and sore shoulders than was found in a control group of non-CRT users. The report indicated that anxiety problems might be intensified through using CRTs.

The findings were published in a recent draft report on an investigation conducted in January at the San Francisco Chronicle and Examiner and the Oakland (Calif.) Tribune at the request of a number of local and international union groups (CW, Feb. 25). Niosh considers the study "the most comprehensive ever done" on CRT safety, both from a radiation and ergonomic perspective.

After the tests at the newspapers, Niosh stated "Based on the measurement data, the current safety standards and present knowledge of biological effects of radiation, the CRTs do not emit radiation levels which present a hazard to the employee."

But in its draft report, Niosh said that the high levels of "mood disturbances" in operators reporting greater anxiety, anger and confusion "indicate that such problems may be exacerbated by CRT use."

The CRT operators experienced more anxiety, depression and anger than a "highly stressed" group of non-CRT users, and this could "signal the presence of a general stress response that could lead to potentially significant psychological dysfunction for individual CRT operators," the report stated.

Advice to Users

Niosh officials advised the newspapers of actions that could minimize, reverse or prevent adverse effects on CRT operators. Among the recommendations in its preliminary written and oral reports were:

- Persons working more-or-less steadily on CRTs should have regular rest breaks.

- In the wake of the findings, the Newspaper Guild instructed its members to include breaks of 15 minutes after one hour or 30 minutes after two hours of CRT work in all contract negotiations.

- Employees should have eye exams before they begin working with CRTs and periodically thereafter.

- Detached and adjustable keyboards and screens should be used on the terminals. The Bay Area tests showed that too many operators had to look down at their screens, and this caused discomfort to their eyes and back.

- Room lighting should be adjusted and controlled, the machines' and their operators' positions specially arranged and other necessary steps taken to minimize glare and associated visual problems.

- Careful attention should be given

to the operators' chairs, which should have adjustable-height seats, adjustable backrests and armrests.

- CRTs should be tested for radiation emissions before being returned to use after servicing. Niosh also suggested the Bureau of Radiological Health might certify machines as meeting emission standards.

The preliminary report's only recommendations for correcting a particular problem dealt with reduction of glare.

The Niosh recommendations pertaining to glare included the following:

- Drapes and/or blinds should be closed, especially during hours of direct sunlight.

- Terminals should be positioned correctly with respect to overhead lighting.

- Hoods may be installed to completely or partially shield the screen.

- Glare shields may be installed.

- Diffusers which prevent glare may be used to cover fluorescent fixtures.

In commenting on the Niosh preliminary findings, Helen Palter, health and safety chair for the San Francisco-Oakland Newspaper Guild, said she hoped Niosh would continue to follow radiation emission standards pertaining to CRTs. The standards levels themselves are questionable, she claimed, noting that this country allows higher levels of radiation than do other countries.

Palter also expressed the hope that CRT manufacturers would take note of the design aspects important for operator comfort.

The final Niosh report is expected next fall.

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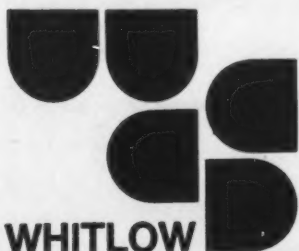
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So give us a call and start getting rid of that "silent P". A healthy sort is a happy sort.

Police Charge 16-Year-Old in \$50,000 Theft

By Jeffery Beeler

CW West Coast Bureau

BERKELEY, Calif. — A local high school student nabbed for suspected computer crimes more than a year ago was arrested again on May 22 for allegedly robbing the University of California's Engineering School of an estimated \$50,000 worth of DP hardware and related materials.

The 16-year-old boy's loot reportedly includes three Data General Corp.

Nova minicomputers plus associated manuals and tapes for testing and maintaining the minis, according to David Wasley, a development engineer with the university's Civil Engineering Department.

The heist also reportedly netted the youth several input/output units, one of which Wasley and local police refused to identify for the record because of its reported "sensitivity" to the case.

Speculation still abounds on the question of exactly how the teenager, who has taken beginning DP courses through the university's extension program, might have intended to use his allegedly stolen gear.

None of the engineering school's disk or tape systems were apparently taken during the recent theft. So, unless the suspect looked elsewhere to fill his mass storage needs, he probably would have had great difficulty in using the

equipment to develop significant applications, Wasley said.

Darker Motive

A more sinister possibility is that the boy intended to use the minis to test random sequences of passwords and, in so doing, possibly gain unauthorized access to the University of California's main computing system, Wasley added.

The second possibility gains credence in light of the suspected youth's background. In January 1979, the teenager was arrested for allegedly using a remote terminal in his home to steal time from the university's DP center and maliciously damage the site's programs and data [CW, Jan. 29].

Following the first arrest, he was found guilty of malicious mischief and placed on formal probation.

The boy's latest brush with the law reportedly began about a year later on Jan. 26 when he allegedly broke into Davis Hall, which houses the university's engineering schools, and swiped a 16K-byte DG Nova 2/4, a 32K-byte Nova 2/10 and an 8K-byte Nova with no model number. He is also alleged to have stolen a Tektronix, Inc. Model 465 and 453 terminal and several modems.

IBM Seen Ready to Present Tripartite Plan

By Connie Winkler

CW Staff

NEW YORK — Settlement talks between IBM and the Department of Justice have apparently moved on from discussing the shape of the peace table to dealing with more substantive matters. IBM's head trial lawyer, Thomas D. Barr, is soon to be presenting IBM's position in the U.S. vs. IBM antitrust case — a possible plan to break the company into three entities — to Department of Justice representatives in Washington, D.C.

IBM is reportedly prepared to submit to the government what it calls the "red, white and blue" plan that would provide for three basically separate companies grouped around what are now the Data Processing (mainframes), General Systems (small busi-

ness computers) and Office Products Divisions.

A similar plan was broached to the government in 1975 — and subsequently hushed. Nevertheless, in terms of products, manufacturing capabilities and internal management organizations, IBM has structured itself into these groupings.

Up until now, the six rounds of settlement talks have been over procedural matters, according to statements by both sides. Representing IBM in those talks were private Washington, D.C., lawyers Clark Clifford and Paul Warnke as well as IBM's general counsel Nicholas deB. Katzenbach.

Those settlement talks, which began in November 1979, were urged by Court of Appeals Judge William H. Mulligan when IBM appeared before

him seeking to have District Court Judge David N. Edelman, now hearing the case, pulled off the job. (The Court of Appeals subsequently rejected IBM's petition.)

The last of these procedural meetings was April 25, at which time both sides said they contemplated further meetings.

In the meantime the trial itself has been adjourned here since March while IBM, readying its final round of witnesses, the economists. IBM says its economic experts are still preparing written narratives, and the direct part of their testimony will be submitted in writing.

Automation Held Threat To Jobs, Worker Identity

(Continued from Page 1)

If that happens, "We could lose sight of central social problems and consequences" and end up with high "structured" unemployment and a low quality of working life, Shaiken warned.

Technology has held out a promise to provide economic growth, he said, but he questioned the expense in terms of jobs, adding "DP" may soon take on a new meaning — displaced person.

Robotics poses a particularly dangerous threat to workers, the author of *Technology as Politics* said. One out of every five jobs on automobile assembly lines will be replaceable by robots in 1985, he quoted from a 1977 report.

General Motors' Programmable Universal Machines for Assembly (Puma) plan will "treat people as cogs, and worse yet, they will be cogs," Shaiken said. With Puma, one worker will labor alongside several robots and follow a mechanically set pace.

"The problem is power masquerading as technology," he said. "A democratic society requires a democratic technology plus the input of people shaping it and their own futures."

Loss of Control

Michael Cooley, a mechanical engineer with Lucas Aerospace in the UK and author of *Architect or Bee? The Human/Technology Relationship*, attacked the loss of human control in the workplace. "We relate to society and other people by the work we do and now we are denying people that," he said.

The capital-intensive nature of automated production processes is largely responsible for the dehumanization of industry, the Briton said, giving as an example the case of a spray painter on a production line. Previously the worker was responsible for turning the

spray on and off, but now he merely acts as a guide for it, Cooley said. While the change may seem negligible to some, the psychological effect can be disastrous, he added.

In one automobile manufacturing plant, workers are subject to an agreement on the makeup of their rest allowance, he said. For trips to the lavatory (placed strategically near the assembly line), they are allowed 1.62 minutes, for fatigue, 1.3 minutes, for sitting down after standing too long, 65 seconds.

White-collar workers are beginning to feel the effects of automation just as blue-collar workers did before them, the mechanical engineer explained.

High-speed design systems have put tremendous strain on designers to the point where one study revealed designers working with an interactive graphics system lost 30% of their ability to deal with new problems during the first hour of operation, 80% in the second "and thereafter were completely shattered," Cooley claimed.

Such systems could be designed to depend more on their human operators, but to do so would put more power on the shop floor — an occurrence management is dead set against, he said.

Cooley cited another study performed on scientific workers who were given some simple but original problems to solve. Based on the results, it was determined that a pure mathematician reaches his peak performance at about age 24 or 25 and a theoretical physicist at around 26.

The study went on to suggest these workers should follow a career pattern that pays them the most during peak performance age and increasingly less as they go through "careers de-escalation," he added.

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CPU Dedicated to One Function

Data Base Processor on Purdue Drawing Board

By John Whitmarsh

CW Staff

ANAHEIM, Calif. — Can we build a true data base machine?

That is, can we build a CPU dedicated exclusively to data base processing that will overcome the current problems of conventional CPU-bound data base systems?

Yes, we can and yes, we will, according to S. Bing Yao of Purdue University.

Such a system is now on the drawing board, Bing told the audience at a National Computer Conference seminar here recently. And, though the prototype will not be operational until 1985, its conception is changing the way technologists view data base systems.

Bing's machine — which is being developed with Benjamin Wah of Purdue and aided by partial funding from the National Science Foundation — is called Dialog (Distributed Associative Logic Data Base Machine).

In concept and eventual execution, Dialog represents "a brand new look at data base processors," Yao said. "Instead of a conventional back-end processor, we want to build a CPU solely to process data base functions at maximum performance."

The problem to date, Yao said, is that "we have always used conventional CPUs to do data base processing. These conventional approaches, either as back-end processors or using CPU accelerators, are CPU-bound."

Also, most previous efforts to design a data base machine have been plagued by cost or staging problems, Yao said.

Back-end data base processors, on the other hand, require extraordinarily large amounts of data transfer, as does parallel processing.

And finally, cellular logic is not cost-effective because it uses a large number of instruction cycles.

All these previous designs are built around a single type of storage device (disk or CCD) that supports the host processor, Yao said. As a result, they all suffer logjams in the transfer of data from storage to the CPU.

"Intramodule operations can be performed very efficiently because they do not utilize the I/O bus," Yao pointed out. "However, intermodule operations often result in a bottleneck at the I/O bus."

Data Modules

But Dialog, because it relies on the replication of "data modules" and not on the host or the transfer of data to it from storage, is not CPU-bound, Yao said.

The individual data modules are the heart of the experimental design. Each module has storage and processing capabilities, and multiple modules are lined in a hierarchical network. With autonomous logic, memory and communications, each data module "becomes a miniature data base machine," Yao explained.

A single cluster of data modules can handle small processing operations; larger processing tasks distribute the processing load from cluster to cluster via a local communications network.

The Purdue design overcomes many of the data transfer problems that have hobbled recent data base systems, Yao said.

"We want to design intelligent but simple processing logic so that it can be replicated on the storage modules. Algorithms such as select, project and join will be implemented in hardware so that they can be processed very efficiently."

"These processors work directly on the storage devices so that the amount of data transfer is kept at a minimum. A network is proposed which provides a uniform medium to connect heterogeneous memory devices together," Yao elaborated.

A query from the host computer is decomposed by a master controller that sends the message to the back-end controller of the appropriate data mod-

ule. The associative processor in the selected module begins the processing, thus freeing up the host to perform other functions.

If, because of the complexity of the query, DP must be shared among modules, the back-end controllers of each data module handle the communications link.

Dialog's Advantages

As presently conceived, Yao said, Dialog has five key advantages over present data base systems:

- Higher performance at lower cost through the replication of cells (data modules).
- The ability to handle "very large"

on-line data bases.

- A design planned around existing disk "or disk-like" memory technology.

- The accommodation of heterogeneous storage devices.

- The use of hardware implementation for low-level operations.

Although Dialog is only in the research stage, Yao has set up an experimental system using a Digital Equipment Corp. PDP-11/70 for the host and 11/23s, each with its own disk storage and connected via a communications network, for the data modules.

The final analysis and simulation of Dialog will not be complete until 1983, Yao said.

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Survey Shows Continued Demand for DPer

(Continued from Page 1)

vices (MIS) directors, data base managers and computer science graduates — were more in demand this year than last.

The survey showed systems software programmers to be second highest in demand, registering a 26.7% increase. Third highest on employers' lists were systems analysts, with a 23.3% increase in demand from last year. Close behind was an 18.1% greater need for DP auditors.

Next highest in demand were data base managers, up 15.7% from mid-1979 demand, followed by telecommunications personnel, experiencing a 14.3% increase in demand from a year ago. Also showing increased demand were programmer/analysts with a 14.1% increase, computer science B.S. graduates with an 11.7% increase and MIS directors showing a 10.1% rise in demand over year-ago figures. In 10th place, scientific programmers showed a 9.7% increase rate, according

to the survey.

Also rising rapidly was demand for skilled sales and marketing specialists in DP hardware, software and services, the survey found.

Salary Jumps

Fueled by the record demand, salaries also rose sharply by mid-1980, according to Fox-Morris.

The highest salaries were offered by firms in cities with the highest cost of living and sporting the largest DP user populations: New York, Los Angeles and Chicago, followed by Boston, Denver, Atlanta, Philadelphia and San Francisco.

Salaries, which rose sharply in all the major industry groups, were found to be highest overall among DP vendor companies, followed by retailing — particularly at top management levels, manufacturing, the federal government and banking. The lowest salary growth was generally found in education, according to the survey.

Salary increases were generally higher than last year's increases and some showed exceptionally high growth. For instance, Fox-Morris

found that a typical newly hired data base manager averaged 8.9 years of DP experience and could expect to earn an average of \$33,800 — a 21% increase from year-ago job figures.

A newly hired applications programmer was found to have an average of 3.5 years of experience and could expect to earn \$21,750, a 16.1% increase from mid-1979. Entry-level B.S. computer science graduates can expect to start at \$16,050 for an increase of 17.5% over year-ago starting figures.

Fox-Morris attributed the high-demand situation in part to the continued increase in low-cost DP products and an "ever-widening circle of eager users."

The insufficient supply of B.S. computer science majors to "fill the demand pipeline" as well as high mortgage rates, making it difficult for home owners to move, have aggravated the situation, the firm said.

The immediate and long-range future of DP personnel will remain the same, the agency said, adding that high salaries and demand will allow DPer to move easily from job to job and will drive salaries up even further.

Denning, Harrison, Wagner Elected to Top ACM Posts

By Bruce Hoard

CW Staff

NEW YORK — Peter J. Denning is the president-elect of the Association for Computing Machinery (ACM). After defeating two other challengers with a majority of the votes, he was declared the winner after ballots were counted May 13.

Denning, the current ACM vice-president, was nominated by an ACM nominating committee, as were his opponents, William Cotterman and Portia Isaacson. His two-year term will run from July 1, 1980 through June 30, 1982.

Michael Harrison will succeed Denning as vice-president, having outpolled John Hamblen to secure the office. Both candidates were nominated by the ACM nominating committee.

Kathleen Wagner, the only candidate for any ACM position to be nominated by petition, was elected secretary over David Brandin and Gerald Engel.

Three members-at-large were elected to four-year terms: Herbert Grosch, David Hsiao and Susan Nycum, with terms running from July 1, 1980 to June 30, 1984.

Also elected were three regional representatives: from the Capitol Region, David Wood; from the European Re-

gion, Robert Parslow; and from the Southeast Region, Charles Williams.

Results from the election for the Mountain Region were invalidated because members there received incorrectly coded return envelopes, an ACM spokesman said. He added that the race between William Healy and Lanie Mischke will be rebaloted "within two or three weeks."

DP Managers Urged to Carve Niche at Top

(Continued from Page 1)

ing, processing and disseminating an organization's data can write his own job description.

Discussing the need for increased productivity in the U.S., Crenner said, "I see information becoming management's prime source for productivity." In fact, he said, "the harnessing of information will be one of the basic tenets of corporate management in the 1980s.

"That's the key — information, gathered laboriously, harnessed and made viable for the decision makers," he continued. "And who analyzes the information, digests it and disseminates it to selected members of the corporate body? Which persons apply

that information in a presentation to the planning or finance managers?"

Where do information managers, "frequently the persons in charge of total computerization," belong "in the hierarchy of a business?" Crenner asked.

It is a question they answer themselves, he said, because general management usually does not understand computerization enough to make that decision. Management dependence on information establishes "the prominence in the company" of the information manager, according to the Dun & Bradstreet executive.

Crenner urged information managers to start thinking like chief executive officers. "A good information man-

ager — or a good computer person — cannot wait to be asked," he said. "The main thing is simply to get aboard, get involved. Be more valuable to your chief executive than your job description would indicate you should be."

Question of Attitude

Information managers "can harness all the information in the world, but if their attitude is that 'it isn't my job,' the job will never be important," Crenner declared.

"If the key to productivity is information, then it behooves every person who looks at or touches information to get on the general management team — to look at the company as if he were the chief executive officer; to suggest to all levels of general management those things which could open doors to new products and services, those things which could streamline and speed the way to increased productivity."

Whether the information managers of the future are executive vice-presidents or clerical workers is a determination they will make by their own actions or inaction, Crenner reiterated.

"Get involved. Don't be passive," he exhorted his audience. "Don't look for a way out; look for a way in."

For years, top management ranks have been filled from the areas of production, marketing and finance. Now, he said, it is time for information managers to have their day.

"Your day has come. You better take advantage of it," Crenner said. "I am suggesting that you are sitting in on an area of business which is undergoing a nuclear explosion," offering opportunities that come rarely.

"And if you believe that information is indeed the key to productivity and bottom-line progress within businesses, then you'll also believe that many chief executives of the future will almost necessarily come from the information processing area."

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Lowest Level in Decades Slump Expected in California Electric Power

By Jeffrey Beeler

CW West Coast Bureau

ANAHEIM, Calif. — California's electric power reserves will sink this summer to their lowest level in decades, and similarly slim margins will prevail throughout much of the rest of the U.S., according to Southern California Edison Co.'s chief planning engineer, David Ned Smith.

In California as a whole, summertime power reserves will average about 9% through August and will dip to about 6% in September, Smith predicted during a closing-day technical session at the recent National Computer Conference. Ideally, the state's supply of reserve power should fall no lower than 17%.

In the southern part of the state, electricity supplies for the summer appear to be "adequate," even though margins will probably decline to their lowest level in 20 years, Smith said.

Elsewhere in California, the supply picture looks less promising, with reserves expected to drop to their lowest point since World War II, Smith continued.

But as long as the state does not experience a prolonged and widespread heat wave or suffer a breakdown of one of its major power-generating and transmission facilities, Californians will probably escape the energy-tight summer relatively unscathed.

Unusually low electric power reserves are also expected to prevail this summer in much of the U.S.' Northeast corridor and in the Chicago area, Smith said.

In other parts of the country, however, electricity supplies for the summer seem to be reasonably plentiful. In Texas, for example, the prospects for relatively large reserves look good, and in the Pacific Northwest, the story is much the same.

Diablo Canyon Project

Smith blamed California's expected shortage of summertime reserve power on licensing delays that have prevented Southern California Edison from starting up its controversial Diablo Canyon nuclear power plant near San Luis Obispo, Calif.

The failure of the Diablo Canyon project to be completed on time has deprived the utility, at least temporarily, of one of the new generating facilities on which it had pinned its hopes for meeting its customers' future electricity needs.

To make matters worse, environmental considerations prevent that utility

from using alternative energy sources like coal to replace the power that otherwise would have been supplied by the unfinished Diablo Canyon plant, Smith said.

Despite the suspension of the Diablo Canyon project, Californians will probably have all the electricity they need, at least for the next few months. But to ensure that an adequate supply is available this time next year, the nuclear generating facility needs to go on-line as soon as possible, he added.

Three-Stage Alert

This summer, as in past summers, California's utilities will rely on a three-stage alert program to conserve

power during periods of unexpectedly high demand. If the amount of electricity reserved for emergency use falls below 5% of projected daily consumption, the state's utilities will announce a Stage 1 alert, in which customers will be asked to voluntarily raise their air conditioner thermostats, defer use of electrical equipment and turn off lighted outdoor signs and similar advertising media.

Mandatory Compliance

If reserves fall below 3%, a Stage 2 alert will automatically take effect. The restrictions on electricity consumption are the same in a Stage 2 alert as in a Stage 1 alert except that

compliance becomes mandatory.

If reserve power drops below 1.5%, the utilities will signal a Stage 3 alert and immediately begin a series of rotating, one-hour blackouts.

Although highly unlikely, a Stage 3 alert is theoretically possible, Smith said, if three adverse conditions are fulfilled simultaneously:

- Power-generating or transmission facilities suffer a higher than expected rate of forced outages.

- The state's utilities find themselves unable to buy backup power from facilities anywhere else in the U.S.

- California falls victim to a statewide heat wave lasting three days or more.

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C11

Correction

Page 22 of the National Computer Conference review appearing in the May 12 issue of *Computerworld* mistakenly stated that the IBM 3276 control unit/display station cannot handle display stations of equivalent or lower model numbers. It can.

The Memorex Corp. 2076 Model 4 remote cluster controller is functionally equivalent to the controller and multiplexing functions of the 3276 and, like it, can handle display stations of equivalent or lower model numbers.

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Weather Models Turn to Tracking Volcanic Ash

By Marguerite Zientara

CW Staff

SUITLAND, Md. — In the aftermath of the devastating eruption of Mount St. Helens in Washington State two weeks ago, a computer model originally designed for weather analysis and forecasting was used to track and forecast the transcontinental path of ash and debris from the volcano.

Developed by the National Oceanic and Atmospheric Administration's (NOAA) Air Resources Laboratory in Silver Spring, Md., five years ago to track "any type of tracer, including nuclear bomb waste or man-made materials," the program normally utilizes data gathered by the National Weather Service from weather balloons, satellites and aircraft, according to NOAA Research Meteorologist Nick Heffter.

The volcanic ash was present at "many different altitudes, each of which has a different wind speed and direction," Heffter explained. Therefore, the computer model was used to analyze seven different atmospheric levels — ranging from 1,500 meters above sea level to 15 kilometers

(60,000 feet) above sea level — in an effort to predict which debris-carrying winds might arrive first at a location.

The Mount St. Helens computer model actually consisted of two other models — a predictive and a trajectory model, Heffter said. "The National Weather Service's predictive model is quite a complicated dynamic model that forecasts such things as wind speed and direction, air temperature, height, pressure and humidity, at six-hour intervals, as far as 84 hours into the future," he said.

"We simply wanted to know where the ash would be going, so we used the National Weather Service forecast as input to our own trajectory model to tell us where the ash would be and when," Heffter noted.

For the volcanic debris predictions, NOAA relied mainly on the National Weather Service's wind speed and direction information gathered from weather balloons that are sent up from 100 U.S. weather stations simultaneously twice a day, he explained.

Interested Observers

Normally used to alert "key personnel in certain government agencies once or twice a day when there is some kind of an alert," according to Heffter, the forecasts in this case were of special interest to the Federal Aviation Administration for flying schedules and to the Environmental Protection Agency for radiation levels.

And were NOAA's twice-daily predictions accurate? "It's hard to say,"

Heffter noted. "The atmosphere is a very complex animal to try and understand."

"Certainly we did have sighting reports from aircraft and people on the ground that seemed to go pretty much with what the predictions were in the first several days," he noted, adding, "After that, the cloud became so diffuse that it's difficult to tell [where it actually went]."

And while the National Meteorological Center's three IBM 370/195s here — normally used for weather analysis and forecasting — handled the complex calculations in the first days of the disaster, present predictions are being calculated by hand and on request only.

Washington DP Survives Volcanic Fallout

(Continued from Page 1)

tions.

For the most part, then, the recent round of volcanic activity has left the state government's basic services vir-

tually intact — at least for the moment.

"We've been very lucky so far," Schmidtke said of the state's DP services organization. "For us, the mountain has erupted at just the right time, and it has allowed us to take a good hard look at how our security precautions should best be tightened. In a sense, we've been given a breathing spell."

Glass-Like Particles

But Schmidtke and his DP colleagues all realize they are not out of the woods — or ash — yet. If the volcano erupts again and winds carry its abrasive discharge in the wrong direction, "we could all be out of business in a minute," he warned.

Ash, indeed, poses a much graver and more immediate threat to the state's five main computing service centers than any other weapon in the volcano's awesome arsenal of destruction. None of the sites lies close enough to the relatively isolated mountain to be seriously imperiled by its explosions or possible lava flows.

But distance affords the centers little, if any, protection from volcanic ash,

which has been spewing out in enormous quantities into the southwestern Washington sky. Once aloft, the substance is caught by high-velocity winds and carried hundreds, even thousands, of miles in all directions. It then falls to earth again in showers so thick it sometimes darkens the sun.

Most of Mount St. Helens' recently expelled ash is so finely minced that it can easily pierce a computing center's outside air filter, travel the length of the building's air conditioning ducts and emerge eventually in an environmentally controlled DP room. There the contaminants, which have the consistency of shaved glass, "can wipe out a disk system in no time flat," Schmidtke said.

Eastern Fallout

To date, the bulk of the volcano's profuse output has blown east and south with the prevailing winds. By far the largest concentrations of volcanic dust, therefore, have fallen on the state government's two easternmost computing centers, one in Pullman, Wash., and the other in Cheney, Wash.

To guard against head crashes and other equipment malfunctions in eastern Washington's comparatively dry and dusty climate, both the Pullman and Cheney sites were designed with fully enclosed cooling systems that shut out external air supplies and continuously recirculate air already inside the buildings.

Another ash-related problem, however, recently proved the two sites' undoing, at least temporarily. Some of the fallout, which when wet becomes highly conductive, covered a few of the state's power substations and threatened them with short circuits.

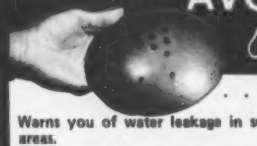
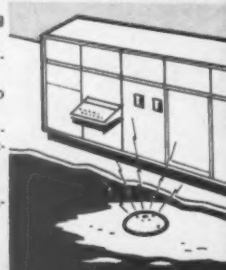
To avert a serious electrical outage, the Pullman and Cheney processing sites were therefore shut down late last month for four and 20 hours, respectively, to give the state's utilities an opportunity to rid the substations of ashy buildup, Schmidtke explained.

The Pullman center uses a 4M-byte Amdahl Corp. 470V/6-based configuration to run the state's library network, court system and other sectors of the Washington government. The Cheney installation, meanwhile, relies on a 1M-byte Univac 90/80 to provide interactive computing for students of Washington's state-supported university.

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QUICKTERM

Panel Sees Pros, Cons Of Talking With CPUs

By Tim Scannell
CW Staff

ANAHEIM, Calif. — Like the advent of motion picture "talkies," voice communications could drastically change the way people view and deal with computers. But users are still a long way from being on true speaking terms with their machines.

"Picking up a telephone and talking with a computer down the hall or across the street" is an attractive proposition, Dr. Wayne A. Lea, a linguist and engineer with Speech Communications Research Laboratory, Inc., said. However, the concept will fail unless "we ride that [technology] crest surefootedly, with integrity and with an eye to human service."

Speaking on a panel at the recent National Computer Conference, Lea and

other voice communications specialists agreed that the idea of literally telling a computer what to do is feasible, but not without its problems. For instance, the limited vocabulary capacities of current devices — presently varying from 40-60 words — often leads to translation confusion.

In addition, since every user has different nuances of speech, the voice unit may have to be adjusted individually for each operator or for male and female speech pitches and patterns.

Most importantly, voice response units do not offer much privacy and can lead to problems if they are used for entering personal data or even monitoring and tracking conversations, Lea observed.

"Every time you build or use a machine, there is risk that it will fail and a risk that it will succeed, at a cost to humans," he noted. While voice I/O is an inevitable part of DP in the '80s, "more work is needed on the technology."

Productivity Enhancer

DENVER — Working from the premise that, as computing products become more numerous, the need for information exchanges on them grows, a nationwide group of users has banded together to form the National Computer Association (NCA).

The NCA will provide a quarterly publication to promote the exchange of ideas, an indexed catalogue of products available from other members and a forum for the presentation of information and exhibits at an annual meeting.

Membership is available for \$35 on an annual basis, and the 1980 meeting will be held Dec. 4-5 in Denver.

More information is available from NCA, 1485 E. Fremont Circle, S. Littleton, Colo. 80122.

ICCC Accepting Preregistrations

ATLANTA — Executives planning to attend the Fifth International Conference on Computer Communication (ICCC) Oct. 27-30 can now preregister for the biennial event.

Fees for the four-day conference are \$175 for preregistration before Sept. 1 and \$200 at the show. The number of attendees is limited to about 1,500 people, a spokesman said.

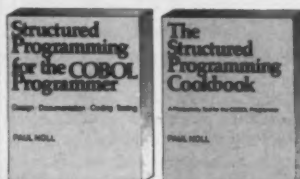
The theme for this year's conference is "Computer Communications: Increasing Benefits for Society" and will include 40 sessions and more than 100 speakers.

The event is sponsored by the International Council for Computer Communications, P.O. Box 280, Basking Ridge, N.J. 07920.



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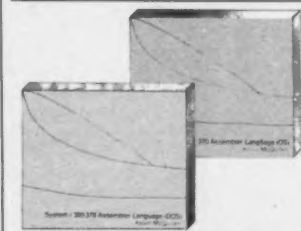
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ALL-2

Although Cubans Processed Smoothly INS Lacking Effective DP Plan, Congress Told

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — With hastily arranged DP support, the Immigration and Naturalization Service (INS) has been smoothly processing the more than 60,000 Cuban refugees who have reached the U.S. in the past few weeks.

However, automation problems continue to plague everyday INS operations, according to congressional investigators.

Congress last year blocked INS DP acquisition plans because of lack of procurement authority and a comprehensive automation blueprint. However, INS officials told Congress last

week the agency is "on the right track now" in developing a long-range DP strategy.

A high-level INS executive committee is currently meeting regularly to develop the information needed to assure successful agency automation, acting INS Commissioner David Crosland told the House Government Information and Individual Rights Subcommittee May 20.

Conflicting Testimony

Crosland's optimism, was in direct conflict with the testimony of congressional auditors, who said INS has made little progress over the last year in solving its DP problems.

"Although INS previously recognized the need for an effective mission and long-range automatic data processing plans, they have, in our opinion, made little progress in developing such plans," Walter Anderson, a senior official of the General Accounting Office (GAO), told the subcommittee.

The GAO, which has been monitoring INS automation efforts since similar hearings last July, found, as recently as March of this year, that the agency has taken little positive action toward automating its paper-choked operations, Anderson said.

The GAO findings clearly dismayed subcommittee Chairman Rep. Richardson Preyer (D-N.C.), who said

"the current influx of tens of thousands of Cuban refugees points up the need of INS to upgrade its recordkeeping capabilities."

On this point, Crosland was able to assure the subcommittee INS is processing the refugees faster than they can be settled. INS officials recently reported that terminal-based systems at embarkation points and processing centers have helped central INS computer facilities smoothly register the Cubans [CW, May 19].

But normal agency operations, which include processing some 274 million aliens — immigrants and visitors — every year, make "the need for considerable automation ... self-evident," Crosland said.

INS "is ill-equipped to deal with the surging volume of paper that has confronted it in recent years," he remarked. "INS handles too much paper involving too many people to be efficient without greater ADP capability than we now have."

Plans Halted

Agency attempts to acquire that increased capability are what got INS in trouble with Congress last year, when the House Government Operations Committee halted INS plans to automate five of its district offices until the agency could conduct proper automation studies [CW Aug. 6].

The General Services Administration (GSA) at that time complained INS had not received the necessary GSA authorization to proceed with the DP procurement. And Congressional investigators reported the bases for the acquisition plan, a "model office" experiment in the INS district office in Houston, had not proven completely successful.

Since then, INS has abandoned the model office concept and is now regrouping to develop a long-range, overall automation scheme as recommended by GAO, Crosland told the subcommittee last week.

Change in Attitude

John Kratzke, project director of the INS management study, assured the subcommittee the agency is now "on the right track". He attributed the progress to "a major change of attitude" on the part of INS upper management, who now have "a strong commitment" to planning and managing DP resources.

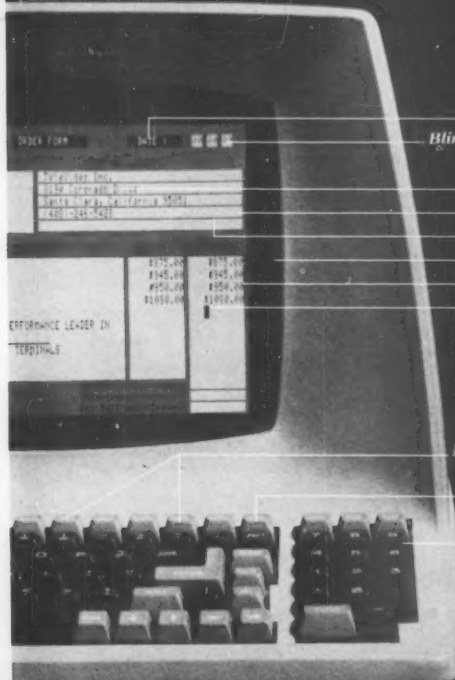
Kratzke's and Crosland's statements, however, were strongly disputed by GAO's Anderson, who said there has been "some internal progress" at INS but not enough to be readily apparent to GAO auditors.

"I'm a little exasperated that the progress has not been greater," said Anderson, noting it has been more than a year since the problems were first identified.

Subcommittee Chairman Preyer, referring to the GAO findings, concluded "INS has some understanding of the enormity of the problem," but has not instituted remedial action "in a practical way."

The agency "has done very little since last July," Preyer said, suggesting INS has spent too much time "trying to go it alone," forsaking assistance available from other agencies.

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To Ensure Effectiveness

MIS Must Meet Corporate Needs, Exec Warns

ANAHEIM, Calif. — Harsh economic realities of the past decade have shown that information systems spawned in the accounting and operational areas of the corporate structure fail to address the total information needs of management.

"Information that is too old or inconsistent cannot be compared or evaluated and hence is of little use," remarked Charles C. Tucker, vice-president of planning and information services at Twentieth Century-Fox Film Corp., before a National Computer Conference audience here recently.

"So as the management information services (MIS) function assumes a more central role within organizations, proper planning becomes vital to ensure that the role played by MIS will be congruent with the objectives of the overall organization," Tucker said.

Systems Planning

By the late '70s, Tucker had seen the need for an information systems planning function at Fox to develop long-range information systems plans for each of the company's three divisions.

The basic planning methodology that Tucker used involved the following steps:

- Projection of the future business environment and its possible implications for information systems development.
- Development of a structured description of the organization based on its operations and definition of the information it uses.
- Design of a network of information systems that would support the organization and manage its information.
- Identification of current information problems and determination of priorities for addressing those problems.

Result — BSP

Under Tucker's guidance, Fox now has an information systems planning methodology that Tucker said increases the responsiveness of MIS to corporate business objectives. The methodology is called Business Systems Planning (BSP).

What is BSP? Tucker defines it as a structured approach to developing an information systems plan that supports near- and long-term business needs of the company's three divisions.

BSP at Fox has six objectives:

- An impartial establishment of information systems priorities.
- The development of "long-life" information systems.
- The management of DP resources that support business goals most efficiently and effectively.
- To increase the confidence of top management that high-return information systems can be produced.
- To improve the relationship between DP and users.
- To increase the awareness of data as a corporate resource.

Savvy Management

Tucker set those objectives believing that information systems play a vital role in the savvy management of a highly competitive company. BSP at

Fox rests on the concept that information systems should:

- Support the business goals and objectives.
- Address the needs of all levels of management.
- Provide data consistency.
- Be able to survive change.
- Be implemented subsystem-by-subsystem within a total information architecture.
- Be planned with a top-down perspective, but implemented from the bottom up.

Traditional Approach

The traditional approach to information systems is to plan at the project

level, Tucker said. "But this leads to the development of independent systems, each with its own data, for each user. Serious shortfalls can result."

First of all, traditional systems do not support plans. Those systems are not easily adapted to organizational change, and their data is redundant and inconsistent, Tucker explained.

"Management views this in terms of systems with short useful lives, which are expensive to operate and maintain and [which] support areas with little impact on the overall success of the company," he added.

The chief advantages of BSP are two: information systems plans tied directly to business plans; and systems de-

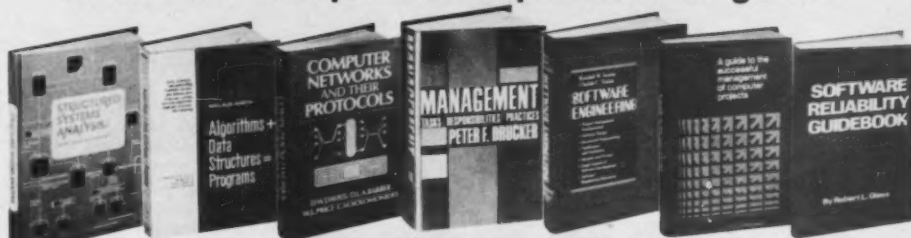
signed around business processes that are organizationally independent.

What results can BSP deliver? Properly implemented, it should, according to Tucker:

- Improve management visibility and communications.
- Address important requirements first.
- Support business plans better than other approaches could.
- Cost less to develop and maintain.
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- Improve DP staff morale and productivity.
- Provide a solid base for long-range DP funding.

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July 1-2, London — **IBM: VM/CMS**. Contact: Online Conferences Ltd., Argyle House, Joel St., Northwood Hills, Middlesex, UK HA6 1TS.

July 6-10, Chicago — **Government Management Information Sciences Conference**. Contact: Charles Collier, Director of Data Services, Dallas County, 504 Records Building, Dallas, Texas 75202.

July 7-8, Summit, N.J. — **Vsam in Cobol**. Contact: Chubb Institute for Computer Technology, 480 Morris Ave., Summit, N.J. 07901.

July 7-9, San Francisco — **Effective Operations Management**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 7-9, San Francisco — **Electronic Mail: An Overview of Concepts, Systems and Applications**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 7-9, Philadelphia — **Leadership Skills for Office Supervisors**. Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020. Also being held July 28-30 in San Francisco.

July 7-9, Dallas — **Word Processing: An Overview of Concepts, Systems and Applications**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 8, Hartford, Conn. — **Files and Formatting**. Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

July 8, Memphis, Tenn. — **Automated Rerun and Tracking System**. Contact: University Computing Co., UCC Tower, Exchange Park, Dallas, Texas 75236. Also being held July 24 in New York.

July 8-9, Raleigh, N.C. — **Strategic Planning for Information Systems**. Contact: Q.E.D. Information Sciences, Inc., 141 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

July 8-10, Boston — **Data Base Design**. Contact: The Institute for Science and Public Affairs, 1370 Avenue of the Americas, New York, N.Y. 10019. Also being held July 28-30 in Denver.

July 8-11, Lansing, Mich. — **Structured Program Design**. Contact: Langston, Kitch & Associates, Inc., 715 E. 8 St., Topeka, Kan. 66607.

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July 9-11, East Hartford, Conn. — **Data Communication Networks**. Contact: Memorex Corp., Customer Education Department, 3393 Octavius MS 03-12, Santa Clara, Calif. 95052. Also being held July 21-23 in Philadelphia and July 23-25 in Houston.

July 9-11, Chicago — **Integration of Word Processing and DP Systems**.

Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 9-11, Washington, D.C. — **Systems Analysis and Design: Concepts and Effective Practice**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 9-11, San Diego — **Data Communications Systems**. Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

July 9-11, Los Angeles — **Introduction to Teleprocessing Software**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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July 10-11, Los Angeles — **Data Communications: Advanced Concepts and Systems**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 11, Chicago — **The Detection of Fraud**. Contact: The Foundation for Continuing Education, 25D Olympia Ave., Woburn, Mass. 01801.

July 14, Washington, D.C. — **Computer Graphics for Business Charting and Mapping**. Contact: AUI Data Graphics, 1701 K. St. N.W., Washington, D.C. 20006.

July 14-15, San Francisco — **Writing SAS Procedures**. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 14-15, San Francisco — **Strategic Planning for Information Systems**. Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

July 14-16, San Francisco — **Data Communications: Effective Network Design**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-16, Toronto — **DP Operations Management**. Contact: University of Chicago, Center for Continuing Education, 1307 E. 60 St., Chicago, Ill. 60637.

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'Everyone's For It, But ...'

Quality Assurance Found Meeting Acceptance

By Rita Shoor
CW Staff

ANAHEIM, Calif. — "Quality assurance is a lot like sex, freedom and democracy. Everyone is for it, but only under certain conditions."

This statement, repeated by Frank Ingrassia from TRW Corp.'s Defense and Space Systems Group (DSSG), typifies the attitude of DP development people as perceived by the five panel members who spoke on "Software Quality Assurance" at the National Computer Conference here recently.

There was general agreement with the observation of William Gallant, member of Sperry Corp.'s Systems Management group, that among programmers and designers there is an increasing acceptance of quality assurance via standards manuals and other control media. Some DPs, however, still regard quality assurance personnel as "company finks," according to session leader Kurt Fischer from Computer Sciences Corp. (CSC).

Robert Dunn, a representative of ITT World Communications, Inc.'s Avionics Division, also noted that an increased number of developers now abide by standards developed by company quality assurance groups. He attributed this increase to the possibility that software quality assurance helps programmers avoid unfair blame for errors that are actually a result of bad specifications and requirements definitions.

The need for a pragmatic approach to software standards was emphasized by both Ingrassia and Fischer. "Programmers and designers are not going to do something stupid just because they're told to [by quality assurance people]," Ingrassia said.

Fischer recommended that quality assurance staff be drawn from the engineers, programmers and designers in the development area rather than hiring "ivory-tower types" to implement quality assurance in the "real world."

Panel members also presented brief overviews of how software product assurance was implemented within their various organizations.

CSC's Group

The quality assurance for the Federal Aviation Administration's automated system for flight service stations is being implemented by approximately 70 CSC personnel and is handled by a product assurance group that reports directly to a division president, according to Fischer. The need for a direct line between quality assurance representatives and top management within a company was viewed as essential by all panel members.

While the product assurance group at CSC is not responsible for testing the product being developed, it does see that there is an independent test group for the software. Additional responsibilities include preparation of design, coding, testing and inspection standards; document review, which Fischer defined as the review of one product; and project audit. At ITT Avionics, all products are based on embedded controllable processors — described by Dunn as micros and minis. The company's software quality

assurance group serves three major functions as:

- A management tool for control and visibility, reporting directly to the vice-president of product assurance.
- A representative of the customer, directing all complaints about the product to the quality assurance members.
- An agency for productivity, reliability and maintainability.

Product quality at ITT equals conformance to specifications, according to Dunn. All quality assurance tools, such as the Debug and Test Log used to "make things easier for the next guy" and to spot error-prone modules — those "that get born sick and never

really get better" — were designed to meet this objective.

Education within the organization also falls within the charter of ITT's quality assurance people. This involves introducing management to "life with software," organizing in-plant symposia on new technologies and assisting in the preparation of product development standards.

TRW and RCA

At TRW, as at the other companies represented by the panel members, the product assurance organization is established independently of line management. Quality assurance is possibly made more complex, Ingrassia said,

because most DSSG contracts are with government agencies, which makes the group subject to military specifications and standards.

Under the software quality assurance heading are these tasks:

- Development and maintenance of a software quality assurance plan.
- Establishment of project standards for design, coding, documentation and testing.
- Participation in formal reviews with both the customer and the internal staff.
- Follow-up to assure conformance of the product to standards.
- Production of required quality assurance records.



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AWC Plans to Boycott NCC '81 in Chicago

ANAHEIM, Calif. — When the Association for Women in Computing (AWC) was formed, its objectives were seen to be "educational rather than political" [CW, Dec. 18, 1978].

Nevertheless, since Illinois has not passed the Equal Rights Amendment, AWC may not participate at the National Computer Conference in Chicago next year.

This announcement came from AWC's President-Elect Linda Taylor here recently, who said the decision was made by AWC members at a meeting on May 18.

Taylor acknowledged that the decision may be "reevaluated" at some fu-

ture date, but the possibility of such a move is evidence of the activity and change going on within the still-fledgling organization since its formation 18 months ago.

With some 1,600 members spread across the U.S., AWC is also "going international" with representatives in both France and Germany, Taylor said.

Practical Tools

The group's basic goal is to provide practical tools for enabling women DPs to further their professional development and advancement, according to Taylor.

One of these is AWC's Technical Review Committee, which was formed to referee technical papers submitted by AWC members. The committee is composed of professional referees who review the documents and provide the authors with guidelines as to the appropriate audience for each paper and possible responses to the subject being covered.

The organization also sponsors local chapter meetings to help women with their professional presentation skills, Taylor continued. AWC is developing an informal communication network where members act as consultants for new women managers and will hopefully provide the sort of contacts now offered to males via the "old boy network."

"We are committed to our members who are self-motivated and believe in the cause," Taylor said. "Women set their goals too low — they say 'I like systems engineering or I'm interested in communications,' but the highest level at which they see themselves is as a systems engineering or communications manager."

"The goal [of AWC] is to highlight these problems and to offer some means to deal with them rather than [having women] adjust and accept them," she observed.

AWC's annual membership dues are currently \$15 and include a quarterly newsletter with the frequency of chapter meetings decided upon by the local members.

Additional information is available from Nancy Bonney, corresponding secretary at E&G Mason Research Institute, 1530 E. Jefferson St., Rockville, Md. 20850.

Service Offered On Office DP

CHICAGO — Former vice-president and manager of office automation at Continental Illinois National Bank and Trust Co. of Chicago, Thomas A. Hannagan, has formed a consulting firm.

Called Thomas A. Hannagan & Associates, Inc., the firm's services include consulting in planning, organization, project management, design and implementation of office automation systems.

The firm also provides consulting services in word processing, electronic mail, voice messaging, color graphics and decision support. Its address is 152 Arlene Ave., Palatine, Ill. 60067.

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By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The federal government, falling farther and farther behind in applying state-of-the-art DP, might eventually have to "abdicate" responsibility for government data processing and rely instead on outside contractors, a group of federal DPer was warned recently.

This gloomy assessment of government DP trends was presented to the federal Interagency Committee on ADP here recently by Vico Henriques, president of the Computer and Business Equipment Manufacturers Association (Cbema), who said the government will continue to trail industry in DP applications unless dramatic changes are made to federal procurement, personnel and systems development policies.

"In the early days of computer development and applications," Henriques noted, "the government was the progenitor, the prod" for U.S. DP growth. But "the impetus was lost" sometime during the early '60s, he said.

Now, he said, "the government is falling farther and farther behind in terms of having systems available to it that are available to the rest of the world."

He attributed this stagnation to the rapid growth of government, its need for expensive systems for centralized management and control and the 1965 Brooks Act that attempted to bring some economy and efficiency to federal DP.

While a good idea at the time, Brooks Act procurement policies and their "concentration on cost avoidance in the procurement of hardware" no longer make as much sense as zeroing in on full life-cycle costs of government systems, according to the Cbema executive.

The acquisition cycle has become so lengthy and costly to vendors that competition, one of the main goals of the Brooks legislation, is being stifled, he maintained. "In spite of the good will and intentions" behind present policies, federal procurement "is all bound up in its regulatory underwear."

"The low bid doesn't always buy what you want," Henriques told the federal DPer. As a result, government agencies are becoming "second-class citizens and can't really buy the 'good stuff.'" They "tend to be sort of the casting-off place for 'the old iron' in the [industry] inventory."

Conversion Costs

Turning to conversion costs, a controversial item bogging down numerous federal DP procurements, Henriques said this problem could be more easily handled if federal installations could better plan long-range systems development.

"Most systems are dynamic and change over time," he explained, suggesting that "if you had a reasonable idea of how long changes would take, you could move through them fairly easily."

The hangup, he continued, is that with the present, cumbersome acquisition practices, it is difficult to plan smooth system development.

To solve some of the federal DP problems, Henriques recommended structuring government operations along industry lines. "Corporate con-

centration is on information policy," not on hardware and software.

The argument that the DP budget and function are important to the entire organization mission "has fallen on deaf ears" in the government, he complained.

One reason for this federal intransigence is that government DP policy-makers are not high in the organizational structure. An information policy manager at the assistant secretary-level in every agency "is an absolute prerequisite for getting on top" of federal DP use, he said.

Along these same lines, more agency independence is vital, he said. "There is no federal government; there are federal governments" — individual departments and agencies doing differ-

ent types of work. Each organization could model itself on an industry counterpart.

New Technologies

Some of the changes he recommended are inevitable as newer technologies become available, according to Henriques. Upcoming offerings such as Xerox Corp.'s Xien satellite communications service will create "interesting alternatives to government trying to design its system" — alternatives that do not fit the present federal procurement classifications.

To take advantage of these new technologies will require drastic changes in government DP personnel policies and practices, he said. Present, restrictive civil service methods cannot compete

with industry in attracting top-notch DPer.

And many federal DPer who develop marketable skills are lured into the private sector, where "they can grow at a greater technological rate than people are allowed to in the government."

Summing up his views of federal DP, Henriques said the administrative and regulatory sides of government data processing are "overburdening the operational side" and "choking the system." The inventory is getting obsolete and the people are getting obsolete in skills, he said.

In the end, he predicted, technology will force government to make some dramatic decisions about how it approaches DP.

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To Expand Opportunities

DPer Urged to Develop Communications Skills

By Tim Scannell
CW Staff

ANAHEIM, Calif. — To take advantage of new opportunities and move up in an average company, a well-rounded DPer has to know how to write and communicate ideas.

If not, that person is doomed to be a perpetual maintainer of a system, locked into a job position as others progress, according to Virginia C. Walker of the Department of Energy's Energy Information Administration.

Leading a panel of speakers recently at the National Computer Conference, Walker explained that DPer's should learn to write and present themselves effectively for three reasons: freedom,

advancement and survival. Technical material should not be presented to anyone if it is too complicated, too lengthy or takes too much time to read.

Pointing out that since most managers have to write abstracts, critiques and status reports, they might as well be able to write them effectively. Technical authors should strive for a balance between the content of a manuscript or presentation and the effort required to get through it.

Writer vs. Technician

Walker noted that there is a definite difference between the technical writer and the technician who can write. While the technical writer is probably

hired by the company to restructure the thoughts of the technician, the technician gives first-hand documentation and reports.

The session leader stressed that programmers should learn to write the same as they were taught to program, with a top-down approach. Start with the objectives of the audience and build a presentation from there, moving from the first outline to a draft to a final product.

As a rule, system documentation should be written at the eighth- to ninth-grade level and technical journals at the 10th- to 12th-grade reading levels. If you are writing at the 14th-grade level, you are in trouble, Walker

remarked.

Anne Work, a senior editorial consultant at Deltak, Inc. and panel member, also advocated simplicity in writing and advised that people should not get themselves tied down to slide or chart "props" when giving a presentation. That way, "you're not totally destroyed if something happens."

Rather than concentrate on technical filler, a speaker should strive to get a sense of what an audience is expecting to hear. For instance, a person who is buying a computer does not want to hear about programming nuances, but would rather talk about costs and future system payoffs, she continued.

Educational Conferences

Dr. Karen Duncan, also on the panel, pointed out that attendants will probably get more of an education from conferences than from a book. Duncan, an author and consultant, cautioned that meetings should be carefully selected, not only by content but by the type of people who will be there.

Managers or programmers attending a conference get the chance to collect a number of nontechnical rewards, such as the development of interpersonal skills; the opportunity to expand presentation, management and writing skills; exposure to creative outlets; and a realization of career advancement opportunities.

In addition, conferences allow a "big picture" look at a profession and help point out the gaps and holes that need filling, Duncan stated.

The Palo Alto, Calif.-based consultant listed a number of ways employees could convince their employers to send them to a conference. One was to offer to teach a class on what happens at the conference or write reports that could be circulated to other company members. Offering to be a company representative or going on your own time are other avenues, she said.

However, if a company refuses to spend any money to send you to a conference or let you take off time to expand your education, it may be time to look for another job, she added.

Finally, Carol Vaughan of the U.S. Bureau of Census offered some tips on moving from the technical side of a company to the people or management area.

The first step is to understand the structure of the organization and whether it is formal or informal. Also, be aware of the firm's constraints on its business environment.

Continuing education in a firm is important because it increases productivity, lowers turnover costs, results in better quality products and boosts moral, she noted.

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Job Hunting Likened To Product Marketing

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — People should package themselves as products if they expect to succeed in the job market, Peter McGregor, vice-president of Executive Register, Inc., said at the National Computer Conference here recently.

"Product planning and career planning are similar," he said, adding a person product must go through three stages: market analysis, product development and product promotion.

If he is employed, the person should assess the market in his present organization before looking outside, McGregor said. In order to do so, he should evaluate the feelings of his co-workers; if most of them are happy and he isn't, "you are in the wrong environment."

Once the person decides to look for work outside of his organization, "he is opening up a Pandora's box," McGregor added.

In order to make sense of the many potential job opportunities, he suggested turning to such publications as

Electronic New Financial Fact Book and Directory and the *F&S Index of Corporations and Industries*.

These publications provide valuable insight for the job hunter by monitoring company trends and changes, he said.

McGregor attempted to put the multitude of DP firms in perspective by likening them to mountains and mountain ranges. Dominant among the mainframe mountains is IBM; moving down to minicomputers, Digital Equipment Corp. is the highest peak, he said.

His advice to college graduates and those DPs with little experience was to climb one of the highest mountains and stay there until they had the knowledge to move to a smaller company. Such movement usually leads to more money and a better job, he said, adding "the catch is, if you leave a DEC or IBM, you also leave security."

Defining Success

Moving along to product development, McGregor defined success as "the progressive realization of predetermined and worthwhile goals" and referred to Abraham Maslow's 10 desires as good objectives. They include money, achievement, recognition, excitement and challenges, knowledge, harmony, competence, security, power and health, he said, adding these desires represent the internal specifications of product development for people.

There are three persons in each of us and they must be balanced against our desires, according to McGregor. Those three persons are the person we want others to think of us as, the person we are and the person we want to be.

The proper balance between desires and identity must take into consideration every aspect of a person, McGregor noted. "Don't accept a job because it pays a few thousand dollars more," he said, warning that if a person ignores the other desires, unhappiness is likely to follow.

Product Promotion

Promoting the product entails pricing it to be competitive, selling it vigorously and distributing it in three different ways, the vice-president explained.

Anyone selling himself as a product must do so aggressively or risk being passed by, McGregor warned, citing a statistic that 83% of fired executives failed to call their achievements to the attention of their superiors.

The first form of distribution is what he referred to as the "door-to-door sale" in which friends and acquaintances are solicited about possible job openings.

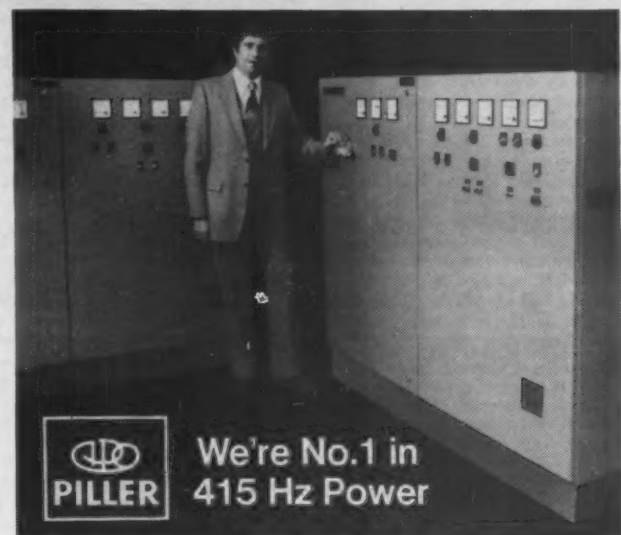
Mail distribution is next, he said, suggesting the job seeker send out 1,000 resumes.

The third and most effective form of distribution is the search firm, the vice-president said, and he advised job hunters to call several companies and ask for the name of a good recruiter. If one name comes up repeatedly, that's the person to get, he said.

McGregor is working on a book entitled *Career Planning for Computer Professionals*.

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Imlay Predicts Industry Trends

ANAHEIM, Calif. — The decade ahead will be marked by a number of trends in information technology, John Imlay, chief executive officer of Management Science America, Inc., said at the National Computer Conference here recently:

- High growth, "even in these times of recession."
- Continued court battles between IBM and the Department of Justice.
- Potentially heightened competition against IBM from Exxon, "if Exxon is dedicated to our field."
- The spread of home communications work stations.
- Reduction in business travel through video-video communications.
- An increasing number of standard software packages.
- A more generous offering of applications software packages from European vendors.
- A stronger Japanese thrust into the software market, based in part on their programmer productivity which, Imlay said, is "four to five times that of programmers in this country."

Three problems cloud this otherwise rosy picture of the industry's future.

First, the people problem will continue to nag the information technology industry. Finding the key people to develop and run increasingly complex systems will be a major hurdle in the '80s as it was in the '70s, Imlay predicted.

Second, the proliferation of the silicon chip will make data security a top priority of business. The average theft by handgun is \$19, but the average theft by computer is \$400,000, Imlay noted, adding that the new heroes on college campuses are not the football stars but those students who can successfully crash a computer system.

Finally, technological obsession threatens to divert business away from the useful applications of computers.

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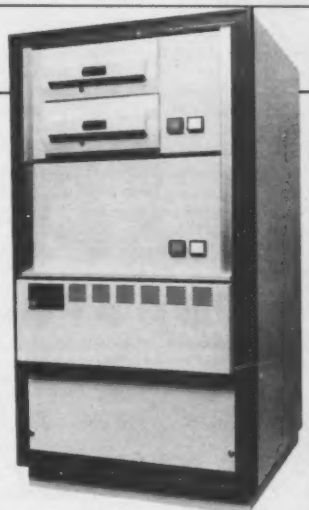
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Series, the C3-B. Its specifications are the same as those of the C3-C. However, the C3-B offers a 74 Megabyte Winchester drive.

For those who do not need hard disk capacity now, but in all probability will need it in the future, Ohio Scientific offers the C3-A. It is like the C3-B and the C3-C in all respects but two. 48K RAM is standard in the C3-A, and it offers 12 open slots. When more storage is needed, the C3-A is easily expandable to either a 23 Megabyte or 74 Megabyte hard disk system. The C3-A is priced at less than \$6,000.

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'Star Wars' Found Easing DP Into Hollywood

By a CW Staff Writer

ANAHEIM, Calif. — Matching wits with man-eating sharks. Leaping tall buildings in a single bound. Intergalactic warfare. Hollywood film studios make these feats seem like effortless and everyday occurrences.

Implementing a DP system — well, that's another story!

Listening to DP executives from two major film companies describe their latest applications at a recent National Computer Conference session here, a DP manager might have been inclined to ask, "So

what else is new?"

While the applications described appear basic to any business, DP has not been as widely accepted in the film industry as in other industries, panelists from the Hollywood film studios agreed.

For a long time, the people running the film studios viewed filmmaking as an art and were reluctant to become involved with the mysteries of computers, according to Omer Simeon, director of corporate DP for Twentieth Century-Fox Film Corp.

Oddly enough, George Lu-

cas' artistic use of computers for animation in *Star Wars* was one reason management at more than one movie studio is increasingly accepting computers in business, Simeon explained.

With films being distributed in nearly 15,000 theaters in the U.S., their makers are increasingly turning to DP systems for production and distribution.

System Test

Simeon's DP group at Twentieth Century-Fox is now putting its Branch On-Line System (Bols) into the testing phase. Although Bols is expected to be fully implemented next year, until now the film distribution function at the company has been 90% manual.

Executives at the studio decided they needed the system because there was a two-week information lag-time between headquarters and the firm's 25 distribution depots, Simeon said.

Those lags often cost money. For example, the film *Silver Streak* garnered critical raves, but was not drawing people to the theaters. Part of the problem was the film studio's advertising campaign. However, because they did not receive box office figures on a timely basis, sales executives did not know the theaters were not doing a hefty business.

The company finally launched a new ad campaign, but could have done it much faster if it had had a film distribution system like Bols.

System Design

Bols will be implemented on four Hewlett-Packard Co. 3000 systems located in key distribution points. Each of the 25 distribution depots will have up to four CRTs and a printer, all supplied by HP.

Information will be transmit-

ted using Digital Dataphone Services' network. Although data will be processed on the Bols system hardware, it will be stored on the host processor at corporate headquarters in Beverly Hills, Calif.

In developing the applications package, Simeon chose to use a language called Imacs, which runs easily with HP's operating system.

The major users of the system — the sales department — developed the system design. The project team consisted of five users and three DP staffers.

Film Distribution

With about 15 films being distributed at any given time, Twentieth Century-Fox can have 100,000 different theater engagements in the works.

The distribution process includes seven steps, all of which will now be tracked by Bols. Those steps include selection of theaters from competitive bids, signing the contract, reserving a print of a film for a particular theater, shipping the print to the local distribution depot and daily tabulation of gross income

from ticket sales.

Approximately 12 executives will receive various reports daily, Simeon noted.

Like Twentieth Century-Fox, MCA, Inc. is now automating large portions of its business, according to Al Jerumanis, vice-president and director of corporate DP.

Jerumanis highlighted, in addition to the usual sales reports, two of MCA's hairier DP problems — a daily payroll and a casting roster. The studio works with 37 separate crafts and guilds, each with different pay scales. Payroll information on those paid on a daily basis is gathered by 1 p.m. By 5 p.m., according to union rules, workers must be paid.

Furthermore, casting problems abound — particularly for walk-on and minor character roles, Jerumanis reported. To keep track of actors, MCA categorizes as many as 150 characteristics of Screen Actors Guild members.

They include not only physical traits, but special skills or possessions such as an antique car that might be needed in a specific scene.

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CLA Names Officers

WASHINGTON, D.C. — The Computer Law Association (CLA), an organization of lawyers and law students interested in legal problems related to computer technology, has elected its officers for the current year.

They are Roy N. Freed, president; Richard L. Bernacchi, senior vice-president; Michael S. Kepling, vice-president; Richard M. McGonigal, vice-president; and Daniel T. Brooks, secretary and treasurer.

More information is available from Joan E. Countryman, SEI Information Technology, 1019 19 St. N.W., Washington, D.C. 20036.

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Cite Need for Power Balance Panelists Cover Groundwork for DDP Success

By Tim Scannell

CW Staff

ANAHEIM, Calif. — Before users implement a distributed or decentralized processing system, they have to consider the long-term financial obligations and establish rules that will help the system run both fairly and effectively.

Users should focus their attention on resource sharing and the problem of enforcing a balance of distributed DP (DDP) powers. Above all, a potential decentralization candidate should avoid the "peons-and-presidents" syndrome that allows company presidents and executives first crack at a system no matter what the job and

leaves the memory leftovers for corporate underlings, according to K.V. Sastry, a member of the programming staff at Univac.

Speaking at the recent National Computer Conference here, Sastry and other panelists outlined the groundwork that has to be laid before implementing a decentralized computer system and discussed some of the pros and cons of dispersed computing. Using a variety of algorithms and a number of cartoons, Sastry underscored the need for fairness in a decentralized environment.

After determining which users will be involved with a system, a system designer should build a data base with a list of scheduling parameters, based on user requirements of response times and amount of system use. The next step is to apply a hierarchical scheduling concept and then carefully monitor the progress and strictly enforce previously set requirements, Sastry said.

Whenever possible, managers should redirect the system's resources from "fat to hungry" users, ensuring that no one particular division gets priority simply because of the bulk of its work, Sastry said, stressing that some kind of an overall system monitor must act as a usage policeman and enforce rules where necessary.

Pros, Cons

Taking a more middle-of-the-road attitude, Prof. Stephen Kwan of Boston University's School of Management listed the pros and cons of decentralization.

Through decentralization, users can have a more rapid response to analyses and processing needs, while working more closely with customers directly affected by the computer. In addition, decentralization allows each computer site to have a certain amount of originality by making it responsible for its specific activities and resulting profit and loss figures, Kwan noted.

Also on the plus side, decentralized users can take advantage of the latest technology because there is not a major investment in any one single piece of hardware. Spreading out DP resources also results in a reduction in overall costs, the ability to modify hardware to meet changing requirements and the automatic establishment of a "fail-soft" disaster-and-recovery system that lets the body of the computer network function when a limb is down, Kwan stated.

Further, because applications are strictly separated by division and computer system, decentralization has the added advantage of supplying a network of natural checkpoints that simplify auditing and monitoring activities, he pointed out.

However, there are a few bad aspects of breaking up a single site into scattered satellites. For instance, access to the central data base may at times be difficult because of heavy data traffic or peripheral use. In addition, distributed sites are often littered with inconsistencies and contradicting standards of operation that result in a duplication of effort, Kwan observed.

Besides increased communications costs, decentralization often leads to problems caused by equipment incompatibility and mismatched personnel

qualifications. Both areas usually spawn difficulties in management control and numerous cases of the left hand not having any idea of what the right hand is doing, Kwan said.

Bank Success Story

California's Security Pacific Bank was cited as a successful case history of decentralized processing. Bennet P. Lientz of the University of California's Graduate School of Management discussed the bank's method of decentralizing on a piece-by-piece basis. Rather than decentralize its whole operation at once, as New York's Citibank did, the more than 500-branch Security Pacific started spreading out its DP func-

tions with a simple real-estate system.

About nine months ago, the bank took its real-estate accounting program off its main computer and installed it on a dedicated Datapoint Corp. minicomputer. Basically an experiment, the system has been working fine. In fact, the system has been working so well that Security Pacific recently expanded the idea and is experimenting with a leasing management system, Lientz noted.

The leasing management program is based on a Tandem Computers, Inc. minicomputer and involves keeping track of third-party car loans. Users access the system over standard telephone lines.

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Canadian Videotex Study Slated for March '81

ANAHEIM, Calif. — While the U.S. may be ignoring potential social implications of videotex technology (see story on Page 21), Canada is on its way to answering some timely questions through a project that will see 1,000 video terminals installed in Toronto homes in March 1981 [CW, Dec. 3].

Sponsored by Bell Canada and called Vista, the project will have an interesting twist: 100 of the 1,000 terminals will be dedicated to studying possible uses by the physically handicapped, the deaf and the blind, explained Jeff Campbell, corporate environment research manager at Bell Canada.

Speaking at the National Computer Conference session entitled "Social Implications of Videotex Systems," Campbell noted that half of the 100

terminals for the handicapped will be installed in institutional environments. The other half will be given to individuals in their homes.

Because the project is a viability study and "not a market trial to price things," there will be no charge to participants. "While that may result in

some unrealistic data," Campbell noted, "once we start charging for the services, then the regulators will want to start regulating."

From March 1981 until the fall of 1981, the system will be strictly an information retrieval system. In the fall of 1981, new software will be added to

allow shopping and electronic funds transfer applications. "We'll be issuing many, many questionnaires to participants, who — except for the handicapped — were chosen randomly, based on demographics and their attitudes toward computers," Campbell said.

Rising Use of Micros Seen Privacy Threat

By Jeffry Beeler

CW West Coast Bureau

ANAHEIM, Calif. — The business community's growing use of microcomputers threatens to compromise personal privacy by creating an unintended "market" for the data bases those systems maintain, according to

Bethesda, Md.-based consultant Fred Weingarten.

Speaking at the recent National Computer Conference, Weingarten explained how easily an unauthorized individual or organization could persuade a small business to sell its confidential employee or customer files.

Weingarten cited a hypothetical example of neighborhood pharmacists who might be tempted to fatten their incomes by supplying their customers' prescription drug records to government employees like narcotics agents or welfare fraud investigators.

By itself, the unauthorized disclosure of an individual's prescription drug history might not seem a serious breach of personal privacy, Weingarten conceded. But combined with personal data from other sources, such a history could give prying eyes a highly revealing picture of an individual's life style, personal habits and even political or religious affiliations.

Other Views

Weingarten's comments came during a technical session exploring the relationship between "Microcomputers and Privacy." Other participants in the session included Robert Belair, an attorney with the Washington, D.C.-based law firm of Hill, Christopher & Phillips; panel chairman Lance Hoffman, a member of the George Washington University faculty; and Jack Nilles, of the University of Southern California's Office of Interdisciplinary Programs.

Reflecting a somewhat different viewpoint from Weingarten's, Nilles voiced serious doubts that the expected proliferation of business microcomputers would severely threaten personal privacy. He did warn, however, of an "enormous potential for harm" if very small systems and the expertise to use them "fell into the wrong hands."

As micros continue to drop rapidly in price, small businesses could increasingly use the machines to gain unauthorized access to, for instance, a local credit bureau's data files and divulge the information to others, either accidentally or intentionally. But, although such security breaches certainly are technologically feasible, economic constraints will probably prevent them from happening very often, if at all, Nilles said.

'Computer Guerrillas'

On the other hand, Nilles added, intentional efforts to violate personal security could prove disastrous and should be guarded against at all costs. As an example, he cited a possible threat from so-called "computer guerrillas," who could do "tremendous harm" to large central mainframes by barraging them with data from remote, inexpensive microcomputers.

Compared to the rest of the four-member panel, Belair took an admittedly more "skeptical" view of the microcomputer-and-privacy question. So little personal data will be stored in business or home microcomputers, Belair predicted, that the machines will pose few if any additional personal privacy threats.

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May Create 'Information Elite' U.S. Seen Ignoring Social Impact of Videotex

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — "There has been very little thought in the U.S. about the social implications of home and business information systems known as videotex, even though test systems are going in several areas of the country," according to Robert Johansen, senior research fellow at the Institute for the Future in Menlo Park, Calif.

That was the central statement of the National Computer Conference session, "Social Implications of Videotex Systems," which defined such systems as including both text and graphics systems provided on an interactive ba-

sis, often using both telephone and television in concert with computers.

Noting that the federal government "is standing back and allowing things to happen" without investigating the issue, Johansen contended that it should instead look at the implications of various policies "without shaping their development in a rigid way."

Projected Distribution

While no studies have been made of social implications, numerical projections exist suggesting, for example, that more than three million microcomputers will be dedicated to personal use in homes by the mid-1980s.

"We think about half the personal computers in use in the late 1980s will be able to interact via telephone lines," predicted Jack Nilles, a researcher in the office of the executive vice-president of the University of Southern California (USC).

Basing his conclusions on a two-year study conducted by USC's School of Communications, Nilles also projected that 10 million to 40 million microcomputers are expected to exist in homes by 1980, "depending on the quality of software and services available for illiterate and quasi-literate computer users."

Speculating that the earliest users of such information systems may be businesses, he theorized that "from 1.5 million to three million microcomputers will be located in small businesses by the mid-1980s, with four million to eight million expected by 1990."

As for the significance of such statistics, "The fast-decreasing cost of stand-alone computers will eventually cause a confluence of technologies to occur."

"Users with \$200 full stand-alone microcomputers systems will start using them to do other things like access informational data bases or transaction services."

"The prevalent scenario suggests a gradual increase in usage for the next

two to three years, then a more rapid proliferation in the early 1990s and, around 2000 or 2010, a personal computer or teletext device in every household in the U.S.," he said.

"The intriguing social implications are that those services are likely to go to the more affluent, information-intensive sector of the population — the 'information elite' " Nilles suggested.

"Meanwhile, the 'information disadvantaged' will comprise a large segment of the population, for which there is currently no constituency because the government doesn't deal with such questions," he added.

Exactly what will people use these

systems for? "Just as now, demand will be for such things as local news and market information on who sells what at the best price," he said.

"The biggest near-term problem with the existing systems is that they are not technically competent to handle the demands that people will soon make on them. For example, they are not yet well developed enough to offer something as broad-based as complete newspaper presentation."

"The premature introduction of insufficiently developed systems may set the technology back several years," Nilles warned, "because people will reject them and have to be reconvinced later to try again."

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Corbato Gets Goode Award

ANAHEIM, Calif. — This year's Harry Goode Memorial Award went to Dr. Fernando J. Corbato in recognition of his contribution to the development of time-shared computer systems.

The award, presented here recently by the American Federation of Information Processing Societies, Inc. (AFIPS), was established in 1964 and is considered to be that organization's most prestigious prize.

Building on research started on time-sharing systems at MIT in 1960, Corbato was a major initiator of the development of the Multiplexed Information and Computing Service (Multics) undertaken jointly by MIT, General Electric Co. and Bell Laboratories in 1964.

In addition to helping develop Multics, Corbato was instrumental in arranging for the commercialization of the system by Honeywell, Inc. in 1973.

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Broader View of Industry Urged CPUs Called All-Purpose Productivity Tools

By Marcia Blumenthal

CW Staff

ANAHEIM, Calif. — With a zero percent overall U.S. productivity growth rate last year — an all-time low — Edson de Castro thinks computers may no longer be considered merely DP vehicles.

Rather, the chairman and president of Data General Corp. believes computer systems to be "all-purpose productivity tools . . . We may be in the cost-cutting business and don't realize it."

Drawing an analogy between the computer and railroad industries, he noted that many railroads failed because they continued to think of them-

selves as being in the railroad rather than in the transportation business.

Like the railroads, the computer industry must take a broader view of its mandate, de Castro urged during a keynote session at the National Computer Conference here recently.

Small computers are becoming the appropriate technology to assist businesses to achieve productivity gains, he noted. However, to do this, the industry must create the technology that will allow small business systems to increasingly be used as productivity tools.

If up-and-coming technologies, including large-scale integration, are incorporated into small business sys-

tems, those systems can handle two times the throughput, three times the storage capacity, four times the peripherals load and five times the main memory of current systems at half the current cost, he maintained.

Key to Advances

Key to technological advances is software, which by the end of the decade will account for 50% of the cost of a small business system as opposed to the current 10%, he said.

Among these technologies are new interfaces that will permit verbal communications with processors by voice recognition and speech analysis. Small systems should also incorporate image

processing.

Without drawing on the central processor, small business systems should be able to operate as fixed-function terminals offering graphics and office automation capabilities.

These systems of the future must also incorporate communications functions such as PBX data and voice switches, which will cut the cost of electronic mail, data transmission and word processing, he suggested.

The software driving these systems must include the capability of handling nonprocedural languages that tell the machine what to do. This exists today in rudimentary form in data base query facilities on some small business computers.

In addition, software must simplify interactive data input and create the ability to ask "what if" questions of the data base without writing enormous amounts of code.

Security Features

With increased ease of use, manufacturers must be careful to build security into the system using more and more firmware so that inexperienced users will be able to change code without endangering anything set in the system, de Castro emphasized.

To be truly cost-effective, however, small business systems must have a data management system that will tie both word processing and DP together. At the same time vendors must provide users retraining and the orientation necessary to interact with the system.

While companies have the technology today to build small business systems needed to improve the productivity of businesses, to date most companies have taken only partial steps to totally integrate systems.

Price Elected To DPMA Post

PARK RIDGE, Ill. — The Education Foundation of the Data Processing Management Association (DPMA) has elected Donald E. Price, dean of computing and information sciences at Sierra College in Rocklin, Calif., as its president for 1980.

Dr. William Hetzel, senior vice-president of administration for Florida Blue Cross/Blue Shield in Jacksonville, was elected vice-president. Hetzel was also recently named a member of the foundation's board of regents.

In addition to his new post, Price also serves as DPMA international vice-president, responsible for education activities. At Sierra College he is in charge of all administrative and instructional computing support.

FUTURE SYSTEMS FORUM

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An international conference to analyse and forecast trends in information systems in the 1980s.

Online have arranged, in association with Advanced Computer Techniques Corporation, to present in London 'Future Systems Forum' which is a European up date of a highly successful conference recently held in Phoenix Arizona.

It is an appraisal of likely future developments in large scale computing, communications and office automation. This will deal with forecasts of the probable characteristics and price structure of the IBM new range, including Series 'H'.

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Future Systems Forum in Phoenix received exceptional coverage in the computer press as the selection of quotations below indicate:

"IBM will eventually evolve into a 'gigantic service bureau' (Charles Lecht in the keynote address at Future Systems Forum)" **Computerworld**

"At Future Systems Forum in Scottsdale, Fertig unveiled the most detailed projections yet" **Electronics**

"(Weil) contended the way to do it is to raise prices especially lease and rental—I believe they'll do it again—and again" **Electronic News**

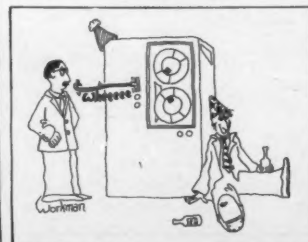
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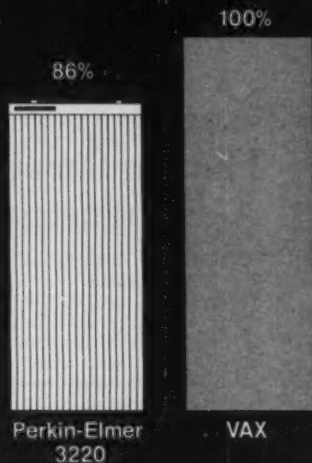
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Automated Office Seen Irrelevant to Executives

By Jeffrey Beeler

CW West Coast Bureau
ANAHEIM, Calif. — Most of today's office automation systems have yet to address senior management's most pressing business problems and needs, according to Office-of-the-Future, Inc.'s founder James Carlisle.

The chief obstacle currently blocking office automation's widespread acceptance is its almost total irrelevancy for most top executives and their organizations, the head of the Guttenberg, N.J.-based consulting firm said recently at the National Computer Con-

ference.

Most of the technology underlying office-of-the-future systems already exists, but vendors have yet to identify the management problems that technology should be used to solve, Carlisle said during a technical session dealing with "Office Automation in the executive Suite."

Needed Features

Studies have shown that typical executives spend an estimated 60% to 80% of each business day in meetings and devote another large chunk of time to making phone calls,

few of which get through to their recipients on the first try.

The emphasis in office automation systems, therefore, should fall on services that allow managers to retrieve needed information quickly and easily from a data base rather than through expensive and often wasteful phone calls, Carlisle said. Office-of-the-future systems should also stress teleconferencing facilities that eliminate unnecessary meetings and increase the efficiency of those that do take place.

Moreover, such systems should provide features that allow executives to screen the masses of information with which they have to contend each day and to set priorities among their conflicting daily activities.

Paper Records

Unfortunately for users, Carlisle said, few of the product capabilities that managers and their corporations need most are available yet in the current office automation marketplace. Instead, much of today's office-of-the-future equipment heavily stresses features like computer modeling or is geared to creating totally paperless working environments.

Carlisle dismissed the paperless office concept as unworkable. "Paperless offices are about as realistic as paperless bathrooms," he said.

In the typical business office, paper records come in so many varieties that the task of fitting them all into a single system has become extremely difficult if not nearly impossible. "Paper records are part of the well-entrenched patterns people have developed for being effective, and you just can't suddenly take those patterns away," Carlisle told an audience estimated at 250 to 300.

Computer Modeling

Carlisle also questioned the wisdom of supplying office automation systems that place a high priority on computer modeling. Few senior executives rely heavily on computer models, he said, because in most cases they incorporate little of the information top management is accustomed to using.

Most of the facts and statistics high-level managers need to do their jobs reside either inside their heads or in conventional filing cabinets, he added.

In implementing an office automation system, users should strive for as much hardware and software modularity as possible to allow themselves to add new subsystems and product features easily. In most other respects,

Carlisle said, the implementation of an office-of-the-future system differs "radically" from the installation of a DP or word processing system.

The task of training executives to use an office automation system requires a larger

investment in time and money than most vendors are willing to make. In addition, office automation systems have to be made as unobtrusive as possible and be designed to avoid overwhelming their users, Carlisle said.

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For Future Information Transfer Panelists Call for Union of Libraries and DP

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — The library is an underdeveloped, underused and underestimated institution that has the potential to play a critical role in the future dissemination of information, National Computer Conference goers were told here recently.

One big problem for libraries desiring to play prominent roles in information transfer is the fact that they are rarely invited to conferences outside of the library field, said Coleen Cayton of the Denver Public Library's Development Office.

Cayton sees a certain affinity between libraries and the DP community because they both speak esoteric languages, and she indicated a strong desire to bring the two institutions closer together.

"If the library is going to make it into the future, we are going to have to learn about bytes and bits and RAMs and ROMs," Cayton observed.

The combination of computer-based technology and library resources can ease the economic pinch many libraries are now feeling and make them "useful agencies again," she said.

Cooperative Action

Ward Shaw, executive director of the Colorado Alliance of Research Libraries, also stressed the economic woes affecting libraries and called for them to maximize their existing resources by banding together in cooperative action.

One such form of action is the shared catalog system, the executive director said, pointing out the Ohio College Library Center (OCLC), a non-profit institution in Columbus, Ohio, as an example.

OCLC currently has 30 computers of varying size and more than 3000 terminals exchanging bibliographical information nationwide, he noted.

National Network

A more ambitious plan he called for is the creation of a national information network.

"A national network would be very complex and do more than just collect documents and provide them to the public," he said. "And we need people in the informational science community to manage and maintain it."

Many kinds of groups, legislative agencies and existing and planned network organizations would all have a stake in a national information network and all would have to compromise their special interests to make it run smoothly, he said.

Such a network would em-

ploy the latest computer, telecommunications and software technology, he noted, adding that a high level of maintenance would be required to make it work.

Push and Pull

Libraries are caught in a "push-pull" situation. They are reaching out to the informational science community

and trying to find what technologies are available to them while trying to define the services they should provide, said Sheldon P. Roufa, president, Data Phase Systems.

Adding to their difficulties is the fact that they have a hard time agreeing among themselves, he said. The multiple use of library numbering systems makes it hard to central-

ize records and exchange information.

For instance, a book may have one Dewey Decimal System number on it in one library and another number in another library, he said.

Although a Library of Congress number is acceptable and uniform in most libraries, that number has not been assigned to a book at the time it

is published, so publishers use their own numbers, compounding the problem, Roufa added.

The president delineated four areas in which libraries have begun to use information technology: transaction processing, library management, bibliographic information and generalized informational processing.

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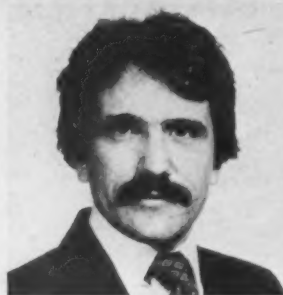
LEN MYERS has been elected assistant vice-president in charge of information systems for Wometco Enterprises, Inc. in Miami.

Myers joined Wometco in 1968 as director of DP and was named director of information systems in 1979. He had previously been manager of computer operations for the International Latex Corp.

Myers is a member of local and national DP associations and serves on the DP Technology Advisory Committee to the Dade County school system.



Myers



Guthrie



Heath

CHARLES W. GUTHRIE has been appointed manager of information systems at Moulinex in Virginia Beach, Va.

Guthrie is in charge of all DP activities for Moulinex Products, Inc. in Danbury, Conn., and Moulinex Manufacturing, Inc. in Virginia Beach.

Guthrie came to Moulinex from Landmark Communications, Inc. in

Norfolk, Va., where he was project leader for advertising systems. Previously, he was with Computer Sciences Corp. in Washington, D.C.

He is a member of the Data Processing Management Association, the Association for Computing Machinery and the Institute of Electrical and Electronics Engineers.

FRANK R. HEATH has been elected vice-president, administration at the Crouse-Hinds Co. in Syracuse, N.Y.

Prior to his appointment, he was vice-president, management systems. Heath will be responsible for the company's administrative functions in addition to his former responsibilities in management systems operations.

Before joining Crouse-Hinds in 1972, he served with Carrier Corp. and Westinghouse Electric Corp. in a variety of engineering computing and systems planning positions.

Heath holds a master's degree in mechanical engineering from the University of Pennsylvania and an M.B.A. from the University of Missouri. He is a member of the Association for Computing Machinery and the Scientific Research Society of America.

in psychology from Temple University. She received her certification as a school psychologist at Millersville State College and a certificate in computer programming from Maxwell Institute.

HANS J. KUSS has been named vice-president at Kenco Corp. in Orlando, Fla. Kuss was most recently director of computer services with Kennedy Skylites, Inc., a division of Kenco Corp.

He held that same position at Illinois Valley Community College before joining the Florida State University system.

Kuss has a bachelor's degree in business administration from Illinois State University. He has also completed graduate work at Florida International University.

WILLIAM L. FERRIS has been promoted to vice-president, information systems at Pacific Mutual Life Insurance Co. in Newport Beach, Calif.

Ferris entered Pacific Mutual's actuarial training program in 1962 and has held a variety of administrative positions. He became assistant vice-president, systems in 1973 and second vice-president in 1975. He was appointed second vice-president, pension service, in 1976. In his new position, Ferris will assume direct operational responsibility for systems and DP.

DAVID W. ROWLEY has been named director of systems planning and development in the Information Services Department of A.H. Robins Co. in Richmond, Va.

Rowley, who joined the company in 1970, formerly was manager of management information systems.

He holds a bachelor's degree in information systems from the University of Maryland and an M.B.A. degree from Fairleigh Dickinson University.

THOMAS G. MURIN has been named director of information services of WCB Group (William C. Brown Companies) in Dubuque, Iowa.

For the past 10 years, Murin has held management positions in DP, the most recent being with Bliss & Laughlin Industries of Oak Brook, Ill. He has also been a lecturer in computer sciences at Calumet College.

In his new position, he will direct the development and administration of information systems and provide services for all WCB companies.

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Separate Programming Standards Keep Design Methodology Simple

Q Recently I was assigned the responsibility of compiling and maintaining a design methodology for our DP division. Since I have very little experience in this area, I am relying primarily on integrating and updating the existing documentation forms and procedures. We have many forms, a few written procedures and a rather extensive programming standards manual.

At one time or another, just about everybody in the division has contributed in some way to the existing standards and procedures. All of these people, except one, approve of the way I'm compiling the design methodology. However, I'm having a disagreement with the person who wrote the 75-page programming standards manual. He believes that even though it was compiled for a batch environment (now all programming is interactive), there are enough good points that it should be included in the new design methodology manual.

Should programming standards be made part of a design methodology manual?

A I am assuming that your manual encompasses the systems development process and therefore programming. Contrary to popular belief, there is no law that states that DP methodologies, standards and policies should be compiled as one volume. For every successful methodology, I could show you 10 reasonable methodologies that aren't used, primarily because of the inclusion of unnecessary material.

As a rule of thumb — keep it simple. A common fault is to include tutorial material like how to design systems using structured approaches or programming standards. This complicates the methodology, making it more difficult to understand and use.

The programming standards should be updated to reflect the interactive environment and placed in a separate manual.

Q After several months of reviewing proposals, our company has decided to change vendors. The two leading contenders are IBM and Control Data Corp. The relative strengths and weaknesses of the two proposed computers do not render any advantage to one vendor. At present, it's a toss-up. All things being equal, which vendor would you recommend?

A If I knew all the facts and were dealing with you on a one-to-one basis, perhaps I could make a recommendation. I am hesitant to make evaluations that are based on emotions rather than reason.

Q I'm a business major/computer science minor who will be graduating this year from a Midwestern university. I'd prefer to find a job in Washington or Oregon, so our placement office is of little use. Of all the recruiting firms in the DP market, I find none that appear willing, much less eager, to assist us "newcomers." Upon calling, one is politely asked to "contact us again when you have at

least one year of experience."

Are there any firms such as these that take people who are studied, yet inexperienced? Or are we forced to take what is available regionally until we have that year under our belt, then add to the already high turnover rate in DP by taking advantage of the newly acquired "privilege" to services provided by the recruiting firms?

A DP recruiting firms are not set up, nor do they want, to compete with the on-campus recruiting system. Therefore, their primary emphasis is on placement of experienced personnel.

It's a seller's market for people with

your credentials (assuming you have adequate grades). Take advantage of this. Recruiters representing national firms will usually forward the results of your on-campus interview to other corporate offices in the geographic locale of your preference. However, you must ask them to do so.

In a mini-survey of three national DP placement services, all were willing to register a person with your credentials. When talking with representatives of these firms, you should stress your knowledge of the use of computers and of the DP functional areas and why this combination of skills is important. If you are well studied in a particular area (such as data base man-

Turnaround Time By Larry E. Long

agement systems or standard cost systems), mention these also. After all, they need something to sell and you have a sellable combination of skills.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Long is a professor at Lehigh University, a DP consultant and author.

What's the difference between BASIC and Pascal?

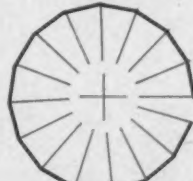
COMPARE THESE APPROACHES TO DRAWING A CIRCLE

in BASIC

"This is easy..."

```
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```

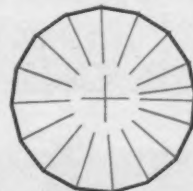
"Oops, didn't quite meet..."



...but that's easy to fix."

```
100 MOVE R,0
110 FOR T=0 TO 360 STEP 25
120 DRAW R*COS(T), R*SIN(T)
130 NEXT T
```

"Oh, now it closes...
in fact, it overlaps."

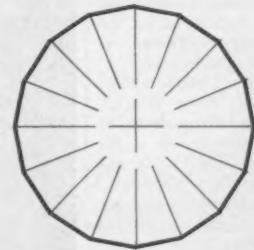


Programming by trial and error

in Pascal

"The simplest circle drawn with line segments is a regular polygon..."

```
procedure Circle (X, Y, Radius: real);
const Sides = 16; Pi = 3.14159265;
var N: integer; Theta: real;
begin
  Move (X+Radius, Y);
  for N = 1 to Sides do begin
    Theta := 2 * Pi * (N/Sides);
    Draw (Radius * cos (Theta) + X,
          Radius * sin (Theta) + Y);
  end;
end;
```



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CW 1

System to Trim Waits at Motor Vehicle Office

By Bruce Hoard
CW Staff

COLORADO SPRINGS, Colo. — A computer system being installed here to speed up Department of Motor Vehicle transactions is expected to drastically reduce the reams of paperwork now produced daily.

"On a good day, it takes 45 minutes to process the necessary paperwork for a title or registration transaction," according to El Paso county clerk and recorder Ardis Schmitt, who is charged with running the Department of Motor Vehicles.

"With our new system," she continued, "it will take 10 minutes." What Schmitt referred to as "behind-the-scenes" time, or the time spent processing transactions and typing after the customer has left the office, will also be pared considerably, she said.

The county is installing a Digital Equipment Corp. PDP-11/60 with 256K bytes of main memory and two PDP-11/03s with 60K bytes each to work with the larger, 512K-byte DEC 1080 KL already in operation, according to Tino Archuleta, vice-president of systems development for Data Management Associates, which has a contract with El Paso County to set up and operate the system.

Sixteen Hazeltine Corp. 1500 terminals will be initially installed with the system, and their number will be bolstered to 24 after employees get used to operating them, he said.

Hierarchical Setup

Archuleta's company is setting up a hierarchical system in which the 11/03s are front ends for the 1160, which in turn feeds data to the 1080. The 1080 will do all of the system's large-scale batch reporting at night, he said.

The 11/60 will house the Department of Motor Vehicles' data base and terminals will be connected directly to it, he said, adding the 11/03s will also be linked to terminals.

This particular configuration was chosen because it can facilitate transaction from remote offices when they are tied in and allows the 11/03s to act as backup if the 11/60 goes down, Archuleta said.

In the case of remote office

expansion, "all we have to do is add another 1103 at the site and tie that with one line to the 1160," he explained.

Choices Eliminated

Before assembling the DEC configuration, Data Management Associates considered Data General Corp. and NCR Corp. products but eventually rejected them because they were not compatible with the DEC 1080, which is at the

heart of the county's DP system, he said.

Another reason for staying with DEC was that the county was already running record management software on the 1080 that is adaptable to Department of Motor Vehicle needs, Archuleta added.

Installation was initially stalled because the vendor was two months late delivering the hardware, a delay Archuleta attributed to the fact that DEC

is selling more computers than it can deliver.

Now, however, the system is demonstrable and can capture data for titles and registration, maintain records and retrieve them by name or license number, he claimed.

Human Side

On the human side of the new system, Schmitt said she and her staff are enthusiastic about the change and no one

will lose his job.

"Our staff will be reduced, but we'll be doing it through attrition," she said, adding "we have quite a lot of turnover."

The increased use of mail will be another time-saver for the county and, as an example, Schmitt noted that previously handwritten cards notifying customers that their titles are ready can now be generated by the computer.

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As 110 Vessels Set Sail

Satellite to Track Transatlantic Yacht Race

By Tim Scannell
CW Staff

PLYMOUTH, England — Early this month, more than 100 yachts will race across the Atlantic toward the U.S., tracked by an airborne referee and a European-based computer system.

The boats will take part in the Observer Single-handed Transatlantic Race, sponsored

by the London newspaper *The Observer* and billed as one of the toughest sporting events of our time. Throughout the race, the 110 sailing vessels will be monitored by a satellite circling more than 500 miles above the water's surface. Information collected by the satellite will be transmitted back to Earth and processed by two computer centers in France, at

Toulouse and Paris.

The race, held every four years, is scheduled to begin on June 7 and will involve sailors from 15 different nations. The U.S., with the largest number of competitors, will be represented by 28 sailors from 14 states.

Piloted by one person, each yacht will be fitted with a small transmitter geared to

collect data on atmospheric pressure and air temperatures once every 40 to 60 seconds. As the boats slice through the ocean waves, the on-board transmitter will flash one-second bursts of weather information to the Tiros-N satellite that circles the globe every 101 minutes. The satellite is part of Argos, a worldwide environmental data collection

system developed by the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration and the French Centre National d'Etudes Spatiales (CNES).

No Set Course

Because there is no set course in the race — the object being to get to the Newport, R.I., finish line as quickly as possible — the satellite's high observation point will be used to pinpoint each vessel within an area of a 3,140-mile diameter.

After the data has been decoded aboard the satellite, it will be transmitted to one of three telemetering stations — Gilmore Creek, near Idaho's Salmon National Forest; Wallops Island, off the Virginia coast; and Lannion, France. From there, the data will be transmitted to the National Environmental Satellite Service Center in Suitland, Md., and then overseas to the CNES complex in Toulouse. At CNES, the raw data will be broken down and processed by the center's Iris 80 computer system.

However, the trek does not stop in Toulouse. From the CNES center, the data will be transferred to large-scale Honeywell, Inc. Level 68 Multics computers in Louvenciennes, Paris, for further processing. The final information pinpointing each boat's location and giving overall placing will then be relayed to the Royal Western Yacht Club in Plymouth, England, the press center in London and the finish line at Newport, R.I.

The entire yacht-to-satellite-to-computer process will take only a few minutes. By contrast, the race is scheduled to take about three weeks, the fastest time so far being around 20 days.

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EDITORIAL

The Emperor's Clothes

During all the excitement and hoopla of a huge exhibition and convention like the National Computer Conference, it's all too easy to overlook some of the facts about the show.

Buried under the huge crowds and the flurry of activity on the convention floor are some disturbing statistics, particularly about the show's technical sessions.

Attendance for these sessions has been dropping steadily over the past few years — both in absolute numbers and in percentage of people who attend the show.

But the technical sessions are supposed to be the show's *raison d'être* — after all, the American Federation of Information Processing Societies (Afips) is a nonprofit organization devoted to promoting technical and scientific subjects. To keep that rating, the NCC must be a technical, scientific or educational experience. Therefore, Afips posts signs around the exhibit floor warning exhibitors that they are not to sell equipment from their stands — they are there to present educational displays.

The whole exercise has become a farce, however.

For one thing, fewer and fewer people attend the pallid technical sessions each year. Full conference registration (paid) this year was probably around 7,000, although there was no one at Afips last week who could confirm that figure. Ten years ago — when there were two shows a year and when the technical program meant something — around 10,000 people per show (or 20,000 per year) would attend the technical sessions.

While this year's sessions drew only 7,000, that number was dwarfed by the more than 15,000 exhibitor personnel who were registered for the show and the 40,000 or so visitors who showed up just to see the exhibits.

(Actually it is a bit hard to tell just how many people come to the show. Afips sends out exhibit guest badges in advance — 28,000 this year — but has no idea how many show up. Out of the more than 80,000 attendees claimed for this show, the real number is probably 10% less, officials admit.)

And people didn't come to the exhibits just for an educational experience — and the exhibitors didn't lay out as much as a quarter of a million dollars just to educate the public. Exhibitors openly brag about sales leads garnered on the floor and talk about selling out their equipment on display during the show.

There's nothing wrong with all this, of course, except for the hypocrisy of the entire exercise. After all, sales are the lifeblood of the industry and shows can be effective sales tools.

However, a spade should be called by the right name.

Ever since Afips decided to hold one show a year — in a major population center — the show has been dominated by the exhibits, with less and less of interest in the technical sessions to general DPs.

The name of the game is sales, not education.



LETTERS

Shortchanged by Report

As the user of a Honeywell, Inc./Xerox Corp. Sigma mainframe running CP-V, I feel I was short-changed by "Users Rate Amdahl First, Honeywell Last" [CW, May 19].

While I will be the last to claim that our relationship with Honeywell has been a continually orgasmic affair, your three-headline blast at the company was a bit of a cheap shot. It made no reference to CP-V, which has been a shining star under both Xerox and Honeywell. I have no reason to believe that its successor project, CP-6, will be any less successful.

Perhaps the clincher was on Page 5, where we were told that users of IBM-type systems are sophisticated. While I don't care to take issue with that headline, I would like to point out that running CP-V on 1964-vintage iron, we have been using data base management systems extensively for the past 10 years.

We have experience with distributed DP spanning a similar time period and have had production transaction processing applications in operation for at least eight years. Text processing has been used extensively for six years, and we are presently in communication with word processing systems on this campus.

It grieves me to hear that we are being technically blown out of the water by companies that did not even exist when we implemented such applications.

Jon E. Eschinger
Director

Office of Computer Activities
Bucknell University
Lewisburg, Pa.

Shame on IBM

How did you like the new IBM 4331, Phase 2 announcement? Do you remember the IBM 360/30 2-msec machine, which had to be converted to 1.5 msec? Doesn't this look like a new

"bait-and-switch" announcement by IBM? Is this a case of a pricing problem which is being rectified through a new gimmick?

Shame on IBM. It appears that it announced the product in order to stop the competition, eliminate their businesses, thwart the Japanese and destroy future competition with its paper tiger. Shame on IBM in supplying a machine that can't be supported with software that requires ferocious overhead.

This is just a new way of announcing a major price increase. Shame on IBM in selling these products through brokers and dealers at premiums under their "gottcha policy."

Is this a new IBM announcement? Shame on IBM.

George S. McLaughlin
Summit, N.J.

Figures in Error

Thank you for printing the report on user ratings based on the Datapro report [CW, May 19]. I plan to reference it — and, hopefully, the follow-up report on minicomputers in the May 26 issue — in a DP plan my management has requested.

However, I have noticed several numerical inaccuracies:

- 1) Total user sites add up to 1,988, not 2,006.
- 2) Total systems installed add up to 2,885, not 3,885.
- 3) Model types total 72, not 75 including others.

The difference of 18 user sites is with the IBM group, which adds up to 1,131, not 1,149.

Herbert A. Schwabe Jr.
Bala-Cynwyd, Pa.

Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to Editor, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

DATA PAST

Five Years Ago June 4, 1975

PHILADELPHIA — The "EDP specialist" of the 1960s, known first for his technical expertise and only secondarily for his ability to manage, was replaced in the '70s by the "DP manager" who must handle people as well as — if not better than — he manages machines. The growing dependence of business on computing demanded that there continue to be "an increasing recognition of the functions of the DP manager as to his importance in the corporate hierarchy as well as to his re-

lationship to other managers," an Auerbach study profiling the DP manager found.

Eight Years Ago June 7, 1972

PHILADELPHIA — Univac introduced the 8460, a disk storage subsystem designed for users who need large-capacity, on-line information files. Up to 2.2 billion characters of storage could be on-line and available in an average access time of 55 msec at an average transfer rate of three million bit/sec.

READER COMMENTARY/Robert C. Schlegel

Management Needs Long-Term Personnel Plan

The ongoing shortage of DP personnel and management actions to deal with recruiting and retention problems are continuing topics in *Computerworld*. Three recent articles, "DPers Highly Mobile" (Nov. 19), "Managing People Effectively" (March 31) and "Network Pros Tipped on Hiring Methods" (April 14), seemed more enlightening than most, if only for the scary job-hopping statistics reported.

A wide variety of "solutions" are offered; for example: developing people skills among supervisors, instituting participative decision-making and giving away free opera tickets.

Bettering productivity and motivation of existing employees are worthy short-term goals regardless of the availability of external labor. However, the serious management problem lies in developing long-term personnel strategy in a continuing seller's mar-

ket. Unfortunately, too few DP managers deal with this strategic problem.

For some organizations, yearly DP turnover rates of 30% to 40% are not uncommon (imagine an entirely new DP workforce every 2-1/2 years!). The resulting lack of knowledge continuity is blamed for lower productivity and inferior system quality.

Yet, in each marketplace that has high turnover, there are likely to be a few firms employing good people at standard salaries and with only 5% to 10% turnover. Why?

The secret for long-term personnel strategy is not really management style, but careful employee selection, periodic training and challenging utilization. We are told that people with DP skills feel a strong professional orientation that tends to reduce their overall employer identity and loyalty. Actions that increase or sustain this

loyalty can carry significant payoffs.

Some of the more successful long-term personnel strategies and their associated policies are the following:

- Increase internal transfers and promotions into the DP department. Identify non-DP employees of the firm who show computer skills aptitude. Using volunteers, establish a formal training program, perhaps part-time. Most, if not all of these graduates can be transferred into the DP organization with two important attributes: (1) they have practical knowledge of how user departments are run, and (2) they have already demonstrated an organizational commitment by remaining with the firm in their present job.

Fears that vast numbers of these employees will leave once trained haven't been borne out by companies attacking the problem in this way. Even if the trained employee returns to his or

her original department, their DP skills will undoubtedly help bridge the communications gap on future projects.

- Avoid universal "overhiring," especially from certain colleges. Some education programs see the computer science curriculum as compiler writing, model construction and electrical engineering. Once the freshness of the new job wears off and the tedium of grinding through Cobol programs sets in, these graduates are likely to begin searching for new windmills to tilt. Managers should look carefully at their ability to utilize an individual's talents. Gross underemployment breeds dissatisfaction.

- Evaluate likely job candidates based on their ability to perform DP work. Reexamine your "qualifications" for specific DP jobs. Many firms demand a bachelor's degree, assuming that a college graduate has the ability to "conceptualize" and understand the logic of programming. But an analysis of DP duties usually finds that the ability to code requires knowledge of fundamental arithmetic, a logical mind and a high frustration tolerance.

Analytical ability is often a function of maturity and experience, as are interpersonal skills. Attainment of an educational sheepskin may show perseverance, but the lack of one should not become a barrier to employment.

- Be wary of the experienced candidate with many prior employers — you too could become a credit on a resume.

(Continued on Page 32)

THE TAYLOR REPORT/Alan Taylor

Virtual Cobols Ahead for Micros

During the '60s and '70s, the vast bulk of commercial investment in both programmers and programs was concentrated in the Cobol sector. The good sense of investing in Cobol — instead of PL/I, for instance — is shown by the continuing spread of Cobol across the range of systems, now including minis and micros.

Digital Equipment Corp., for instance, has just come up with an important 32-bit Cobol for its successful VAX line of systems, while Radio Shack is putting Cobol onto its small TRS-80 Model II, as Jon Shirley of that firm pointed out in a recent letter [CW, May 5].

All this is well and good from the point of view of the new Radio Shack, DEC or other mini or micro manufacturer. But from the current Cobol user's perspective, the mini or micro Cobol's aim is to achieve full portability of Cobol programs and Cobol programmers.

For current users, with their huge investments in skills and software, it is too late to expect the great Cobols of the '70s to change their characteristics — the proprietary language extensions, the operating system and hardware ties — and so forth. Even if the Cobols on the large mainframes changed design details tomorrow, this would still leave the corporate investments in the basically nontransportable form. And that is where they will remain until the micro and mini Cobols have the ability to accept the current programs and programmers.

Future Cobol offerings (particularly in distributed processing operations where mainframes are being supplanted to some extent by the minis and micros) need to be checked against the higher standards for the '80s and in particular to see that they can easily accept downloaded systems from their bigger brothers and uncles.

Technical Restriction

The only technical restriction to this concept is the memory size, as Shirley

pointed out in his letter. However, the problem of memory restriction was solved more than a decade ago with the development of virtual memories. There is nothing particularly hard about the use of virtual Cobols, except perhaps being able to see their necessity and advantages before they become widely available. Of course, when they become standard, they will be regarded as normal.

Even virtual Cobols, however, will only be successful in preserving current investments if downloading transportability is also provided. This, by definition, includes the ability to move large Cobol programs from the mainframes to the smallest systems and back again.

Almost inevitably, the necessary development will come from the small end, as minis and micros are made capable of running the mainframe programs — somewhat slower because of the increased paging activity, but still economically efficiently. Virtual Cobols at the large-system end currently use considerable absolute memory to optimize compilation, and that won't help downloading at all.

The fact that the development has to be done on the smaller processors is a help, rather than a hindrance. In these small-processor marketplaces, software independents can develop and market such systems, and there are so many systems and independents that it becomes almost inevitable that such virtual downloadable Cobols will be developed, with or without the blessing of the computer manufacturer. Independent, standard and government-tested Cobols are not available, and the first, which I am sure will not be the last, was the subject of the April 14 Taylor Report, to which Shirley referred.

These concepts are already working. Cobol departments have downloaded massive programs to minis; and I can see no reason why the trend won't continue — at least if users and developers realize that industry will want to

operate with two-way transportability between large and small systems.

The alternative development — restricted Cobol or Cobol-like languages on the small systems that have to go through the standard conversion-testing and programmer-retraining chaos before they can be used freely on either size system — will deservedly be

(Continued on Page 33)

HUMAN CONNECTION/Jack Stone

DP Manager Gives Tips On Reaching Top Execs

Here's your nontrivial question of the day: How many top executives do you think really understand the role of DP in their organizations?

I believe the answer is "not that many." The communications between these people and the DPers are, generally speaking, dismal, and this leads to gross misunderstandings about the mission and responsibilities of DP departments.

So it's a cause for celebration to write that I finally met a DP manager who stated that he has a successful approach to working with the executive suite. He is Len Bunker, manager of management information services (MIS) for the Government Products Division of United Technology Corp.'s Pratt and Whitney Aircraft Group (W. Palm Beach, Fla.).

Following are Bunker's comments about his technique:

"There's no doubt that the most significant challenge we DP managers face — relative to the long-range development of the DP function — is to find ways to communicate easily and effectively with senior executives. Although it is important to the health and welfare of the company that DPers truly understand the informa-

tion goals and needs of business and develop solutions to these needs, it is just as important that we be able to explain these solutions to the executives so that they will understand the reasons for, and endorse financial commitments to, data processing.

"DP managers need to build a strategy whereby DP funding is treated by the executives as a capital item, not too different from the plant construction budget, and is subjected to the same kind of scrutiny. DP plans and programs must be tied to the fundamental operating parameters of the business, and that involves the profit plan, business thrust and corporate goals.

"And in today's economic climate, it is essential that major system developments or extensions be clearly shown to contribute to productivity increases or cost savings. But it's getting tougher to justify the resource expenditures for large in-house development projects, which has encouraged us to look more closely at software packages, even if they don't meet our total requirements.

"Of course, the largest gain from DP applications is productivity derived from the enabling technology, and our staff spends many hours with top

(Continued on Page 32)

DP Managers Need Long-Term Plan for Staffs

(Continued from Page 31)

Your success in luring candidates will net, regardless of technical excellence, employees who have demonstrated they can be enticed away from their employing firms.

- Investigate the quality of experience claimed by candidates. Careful selection should distinguish between the professional and the fuzz-brain who may not be very productive. Both, for example, may have programmed in structured Cobol on a similar application system, yet their productive efforts could be widely different.

Inquire carefully into why previous jobs were unsatisfactory. Ask to see an example of that structured Cobol or engineer a performance test to deter-

mine how good the candidate really is. The good ones shouldn't mind.

- Provide challenge to present DP personnel by expanding training opportunities. Some writers have recently suggested that increased training will lower turnover. Regardless of the theory, many DP people become dissatisfied with their jobs when the work becomes repetitive and doesn't allow learning of new concepts. Set training objectives and apply learned skills in future projects whenever possible. The training program should, of course, support your organizational goals.

Keep in mind that training for depth as well as for unique skills is a legitimate management decision. Cross-training decreases the risk of a knowl-

edge gap if an employee does leave.

- Make job rotation from one project to another a matter of policy. This may provoke some grumbling, but the risk of losing key people because of stagnation outweighs the possible cost of displacing some acquired administrative knowledge.

After all, most difficulties arise in performing systems maintenance from incomprehensive design and documentation. If the initial designer or programmer remains with the firm in another capacity, he or she should be available to answer questions. Despite the popularity of structured methodologies, the severest problems come about when the original wizard has left the organization and no one is familiar

with the recipe!

Clearly, the retention problem requires management attention to the needs of existing employees in the short term and a coherent strategy to deal with staffing quantity and quality in the long term. Numerous short-term options are available, but most are neutral to the harshness of the external labor market. DP managers must develop long-term personnel policies to avoid constant degradation of scarce human resources. It is unfortunate that our swamp full of alligators has rarely allowed this type of strategic thinking.

Schlegel is a senior management consultant with Price Waterhouse & Co. in Cleveland.

Strategy Helps Reach Top Execs

(Continued from Page 31)

management in the effort to make this technology comprehensible, an investment in time which usually results in faster approvals for new hardware acquisitions. We cannot overlook the importance of the advantage of a keen staff to effectively negotiate with money managers to afford these acquisitions at significant cost reductions.

"We've found that getting management involved tends to remove the mystique from the DP business, and we have used several methods for this purpose:

- Demonstration of existing systems, stressing operational benefits to key users.

- Executive training programs developed in-house and presented by vendors.

- An executive-level DP steering committee.

- A systems review board — with representation from every functional area — which is tasked to advance the applications of DP technology within the corporation.

"Then there's the matter of communications techniques. We've learned, for example, that every session with the top managers should begin with a clearly stated objective, and from that point on, the language used must be completely understood by the executives. Here are some other pointers:

- The higher the level of management, the more general and simplified the presentation perspective should be.

- Try using 'progressive disclosure' techniques — they tend to heighten audience interest.

- Make your presentations entertaining to help ensure executive attention. Interspersing good cartoons — or other audiovisuals — among the slides or charts can also help.

- Be convincing, firm and come across with the image of leadership.

- Make sure your presentation is weighty with important substance.

- Make certain your talk is timely, to the point and significant to the business at hand."

Bunker believes you must select a presenter who has a strong personality and can engage the audience in two-way communication. The presenter must try to act, look and think like an executive, because if he doesn't, neither he nor his words will be accepted and budgets will not be approved.

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Cobol's Survival

Hurrah for Clyde E. Miller's commentary, "Structured Programming in Cobol Needs help" [CW, April 14].

Miller talked in terms of Cobol's "survival." That's a pretty strong word to use when referring to the programming language that has served us so long and so well. What could possibly have happened in 10 short years to have us talking of Cobol's survival?

What has happened, of course, is that good old standard Cobol stood still while the programmer's view of the world changed dramatically. The structured programming "revolution" came, but left many Cobol programmers stumbling endlessly over PERFORM statements written in the name of program refinement. Data base has arrived, and Cobol programmers are wrestling with the equivalent of earlier channel programming as they meticulously define "segment search arguments."

In short, there is now a huge gap between the DP needs of the 1980s and the capacity of the Cobol language to serve those needs.

The answers to this dilemma are not easy to find, for alternatives to Cobol are also not up-to-date. Miller's suggestion to let the precompiler bridge the gap is one alternative that suddenly appears to be quite legitimate, since the precompiler can raise the level of the language by building upon the base. Unfortunately, precompilers are unpopular because they suffer from problems once attributed to Cobol itself; adding cost to the compilation process and generating code that is difficult to map to the original source.

Today, these problems are largely offset. Precompilers are simplifying the data base and data communications interface by providing high-level, Cobol-like syntax rather than cryptic and difficult CALLS to the data base communications package. Further, they can add true structure to conventional Cobol by offering the structured constructs Cobol so sorely lacks. In some cases, precompilers that are supported by strong macro processors are used to raise the level of Cobol in all of

Virtual Cobols Ahead in '80s

(Continued from Page 31)

unpopular.

As corporations digest the economy of decentralized processing using the ever-cheaper and more powerful minis and micros, they will fight the idea of being restricted to using separate Cobols on the different systems, or of having to write the same basic programs differently for the different systems. Marketing of stand-alone Cobols on minis and micros will be hard sledding, although not impossible.

The Cobols need to be unified so that programs and programmers will be able to operate the very different types of systems that will be included in just about every DP operation within the next few years. This means downloadable, virtual Cobols will be needed on the much smaller distributed components, supported by a compatible Cobol on the mainframes.

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LETTERS

these areas at the same time.

Maybe there's life in old Cobol yet!

Richard L. Kauffman
MetaCobol Product
Manager

Applied Data Research, Inc.
Princeton, N.J.

Computing and Congress

As a former House of Representatives Information System (HRIS) systems programmer, I am amazed and amused by *Computerworld's* reporting on the continuing adventures of Rep. Charles Rose (D-N.C.) and his role in the computerization of the House of Representatives.

In the article "Automation Making

Assault on House Members" [CW, Dec. 24], Rose was reported as wanting to "make computerization just a little bit sexier, a little more enticing to congressmen." Consider the triplication of the legislative data base (almost identical data bases exist at the data centers of the House, the Senate and the Library of Congress); the administrative waste of having each congressman set up his own unique payroll schedule; the subsidization of Xerox Corp. by paying it substantial sums for acting as a beta test site for the Amos system; the allowance that congressional members can bypass their own competent computer organization (HRIS) and spend their DP dollars on outside computer services... Are

these more pressing computerization problems than "lack of sexiness"?

Recently CW gave the distinguished representative from North Carolina some more publicity in the article "House Cable TV Net to Carry Data, Facsimile" [April 7]. Did we get any in-depth knowledge from the people who are trying to make the cable a working reality (in large part the systems group at HRIS)? No. Instead the reader got a few words of wisdom from staff director Ken Showalter and a trip report on Rose's Green Thumb Box investigations.

Is it possible that the complexities of DP at the House should be left to the computer professionals there and that Rep. Rose should attend to the non-sexy business of clearing the stumbling blocks in the way of Congress's productive use of computers?

Robert M. Towers
Woodland Hills, Calif.



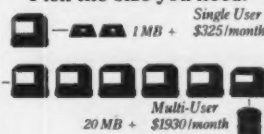
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For Development Projects Users Enjoined to Specify Requirements

By Marcy Rosenberg
CW Staff

ANAHEIM, Calif. — An operating department vice-president was once asked what prevented his people from making good use of management information services (MIS) processing systems. Was it ignorance or apathy? He replied, "I don't know and I don't care."

Relating this vignette to National Computer Conference attendees here recently, Dr. J. David Nauman emphasized the need for user involvement when specifying information requirements for software development projects.

Nauman, a professor at the College of

Business Administration, University of Minnesota, outlined four factors influencing information requirements: the size of the project, the degree of structure, how well the user understands the task and how proficient the developer is at designing the system in question.

Dealing With Uncertainty

However, another less obvious factor influencing the end result of such a project is uncertainty — one can never be sure that the system, or result, will meet the user's needs.

The fact that uncertainty always exists in varying degrees requires developers to employ an available range of requirements

specification strategies to whatever extent will cover the range of uncertainty that is present, Nauman stated.

In other words, instead of relying on a single specifications tool in all cases, the developer should select a range of tools.

For example, if little uncertainty surrounds a project, a developer may base his project specifications solely on user statements; but as uncertainty grows, Nauman advised using one or more of the following tools or strategies: synthesize user statements, interact with a paper model and, at the highest level, interact with prototypes.

Fixed Requirements

A common problem, however, is that when few tools are available, there is a "compulsion" on the part of developers to fix requirements, maintained A.P. Jensen, principal research engineer for the School of Information and Computer Science at Georgia Institute of Technology.

Too often, the scenario goes like this — "First fix the requirements, then develop a product that will meet those requirements and no one can sue you for it," Jensen quipped.

The result? Users grow frustrated at having to depend on computing services over which they have little control. Jensen asserted, therefore, that software developers must be capable of meeting all of the user's needs, and that includes the ultimate, or changing, requirements.

He further charged that the task of modifying a system to meet changing user requirements "is not part of the maintenance (Continued on Page 40)

From Idea to Profit — Part 5 No Two Marketing Pacts Alike

By A.L. Frank
Special to CW

Developing a relationship with a software marketing company is a very complex process. No two contracts are written alike, and because different kinds of marketing organizations exist, a variety of financial arrangements are possible.

The major difference among marketing organizations is the degree of marketing sup-

This last installment of a five-part article on how to bring a homegrown software product to market discusses the pros and cons of various marketing alternatives.

port they will provide for a product. A software company with a national sales and service force that also provides product maintenance and an enhancement plan will generally enter into a different contractual arrangement than an organization that offers sales services only.

This latter type, which sells products through advertising and direct mail but does not support products, will generally offer a developer a higher royalty.

While higher royalties may be attractive, especially to a developer who is getting nervous about the return on his investment dollar, a support-oriented organization will

most likely sell many more products and at a higher price, resulting in a greater profit to the developer over the life of a product.

Five-Year Picture

The following cases illustrate the five-year financial picture for a hypothetical product in three different situations. Note that in these examples, "royalties" refer to the buyer's income, not the seller's.

The first case (see Figure 1 on Page 38) demonstrates what a developer might expect if he were to market the product on his own. The sales price is only \$5,000 because the developer is an unknown entity, cannot launch a large-scale marketing and promo-

(Continued on Page 38)

Transaction Reporting System Unveiled

VIENNA, Va. — The Transaction Reporting System (TRS) from Boeing Computer Services Co. measures activity on Honeywell, Inc.'s DM-IV and TDS transaction processing systems.

TRS provides overview reports that show basic transaction processing behavior, according to Boeing. For example, daily summary and detail reports pinpoint periods of poor machine utilization or poor response, while monthly and year-to-date profile reports show trend and projection analyses of past, current and potential transaction processing usage.

Time-oriented graphs are also available for analyzing daily activity, and monthly and year-to-date plots can perform historical analysis, the vendor said.

In addition, an exception reporting feature is included for identifying and analyzing transactions that exceed performance or utilization objectives.

Perpetual licenses for TRS cost \$9,500 including first-year maintenance. After the first year, maintenance, consisting of telephone consultation and software updates, costs \$1,000 from Boeing at 7980 Gallows Court, Vienna, Va. 22180.

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To Increase Productivity Panel Backs Human-Engineered Software Tools

By Rita Shoor

CW Staff

ANAHEIM, Calif. — Most systems are like Mt. St. Helens behind its veil of volcanic ash: "You can't see the structure for the smoke." With this statement, Leon Stucki from Boeing Corp. opened a recent National Computer Conference session of "Software Tools — The Program Development Environment."

Software tools to be developed in the next decade must be "well human-engineered," he maintained, if they are to be usable in a real-life programming environment. To illustrate this point, he showed textual documentation of one program and contrasted it with the same program expressed in a graphics symbol format. Symbols replace keywords from the text, and the audience agreed that the pictorial representation was preferable in terms of understandable documentation.

This emphasis on graphics representation of program and applications structures rather than letting the code "explain itself" was also of particular concern to panel member Larry Druffel, who is part of the group currently developing the Ada programming language.

Test Prototype

"The first thing a programmer does when he looks at code that is new to him is to start scratching pictures of the logic flow," Druffel said. There should be a software tool that provides the logic illustrations used by the original programmer when developing the code that can also be used by the programmer who is maintaining the code at a later date.

In terms of real-life environments, Druffel advocated making a test prototype of the program available to the user as soon as possible. Users find it difficult to define all of the requirements for a system until they actually have something to work with, he maintained.

The prototype should be developed rapidly without concern for factors such as efficiency or, in Druffel's case, U.S. military requirements. Then the user can play with the program, and the programmer can rewrite it as many times as necessary — within reason — to come up with the results that the user really expects.

G. Dave Bergland from Bell Laboratories, Inc. agreed with the concept of rapid development and, in addition, emphasized the need for a program structure that clearly communicates the functions of the program to some-

one who is reading the code. "The life-cycle cost of a system is largely determined by how well the program communicates with the people [who maintain it] rather than by hardware considerations."

Design Requirements

Structured techniques such as design walk-throughs, test generators and, to some extent, high-level languages are "frosting on the cake," Bergland said. The program must have a communicating structure that provides for ease in maintenance and modification.

He also defined the minimum requirements for good design strategy as correctness, correspondence and con-

sistency. Correctness of a program is implied by how closely it is tied to the specifications. Correspondence is essential in that the parts of the program correspond directly to the parts of the problem. In order to be consistent, Bergland said, the same methodology should provide the same results even if it is applied by 10 different people.

Top Offender

Top-down design methodology was targeted as one of the worst offenders in the area of consistency. If 10 different designers are given the same problem and all of them use top-down design in their solution, "I'll wind up with at least 10 different results," he

claimed. Judging from audience reaction, there was general agreement with this statement.

An objection to the issue of program correctness as defined by Bergland was voiced by James Morris, a representative of Xerox Corp.'s Palo Alto, Calif., Research Center. He maintained that although a program conformed to its specifications, "my experience with a program of any size is that it has hundreds of errors."

In summary, the panel members agreed that user education requirements and generating easily maintainable software in order to increase programmer productivity are the essential requirements for any software tools.

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AIS Fortran Enhancement Offered to Decsystem Users

ANN ARBOR, Mich. — A Fortran enhancement package providing string handling and dynamic array capabilities for Digital Equipment Corp.'s Decsystem-10 and Decsystem-20 users is being offered by Applied Information Systems, Inc. (AIS).

The package supplements the standard Fortran-10/20 system and functions without changes to the compiler, library or runtime system, the vendor claimed, adding that it is compatible with the existing Fortran-10/20 implementation and able to support expected Fortran-77 improvements.

String handling is performed

through function references rather than subroutine calls, enabling the user to specify nested operations, AIS said.

The dynamic array facility is similar to the controlled or based variable facility of PL/I, and user-controlled allocation and deallocation is provided through subroutine calls.

The basic string handling and dynamic array package is offered at an introductory price of \$2,000 through June 30. A 30-day trial is available for a completely credited charge of \$200, AIS said from 9125 McGregor Road, Pinckney, Mich. 48169.

Reference Service Offered

ANAHEIM, Calif. — At the recent National Computer Conference, Auerbach Publishers, Inc. demonstrated an on-line information system that provides computer pricing and hardware information through any terminal.

The Computer-Accessed Reference (Compar) service provides on-line pricing information as well as particular features of mainframe or peripheral products. Each listing in the data base is cross-referenced and can be called up according to memory requirements, pricing restrictions or even printer speeds.

The system is aimed at DP consultants, systems analysts or any other person who needs comparative information on a continually updated basis.

All the user needs to access the service is a CRT or print terminal. Train-

ing is provided by the Auerbach staff, a spokesman said.

While the cost of the service was not available at press time, additional information can be obtained by writing to the firm at 6560 N. Park Drive, Pennsauken, N.J. 08109.

Software Geared To Non-DPers

NORTH PLAINFIELD, N.J. — Horizon II, a software package designed by RAI Business Systems, Inc., is said to bring data base management and computer-assisted modeling capabilities to non-computer-trained management.

The package can be used with Datapoint Corp. business computers. Its data base management function allows users to create and retrieve reports using any information stored on disk, RAI claimed.

Other features include a step-by-step operation manual, CRT prompting and English-like notification of procedural errors as they are made.

For an initial \$12,500 fee, the vendor will conduct classes to fully train operators in Horizon II use. Partial refunds can be obtained up to 30 days after the classes end, RAI said from 130 Rt. 22, North Plainfield, N.J. 07060.

Package for GA Minis Adds 40 Utilities

ARLINGTON, Texas — Microware Associates has developed a package of programs and subroutines for General Automation, Inc. minicomputers running under the DM 130 RTOS operating system.

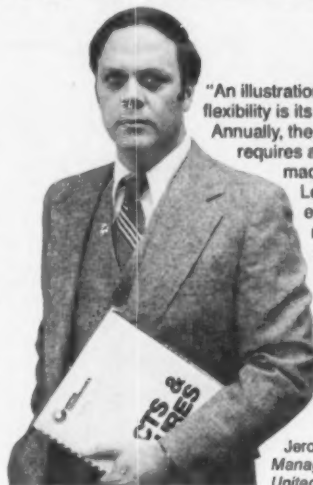
The package consists of 40 utilities — some written in commercial Fortran and others in GA Assembler — that come as source code printed on standard typewriter-size paper.

The package price with documentation is \$870 from the firm at Suite G, 763 Taft, Arlington, Texas 76011.

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Manager, Management Information Systems
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Marketing Pacts Differ in Degree of Support

(Continued from Page 35)
tion program and cannot provide extensive product support.

Figure 2 presents what might be expected if the developer sells the rights to an organization that markets the product for \$10,000 per copy but does not completely support it. Note that the developer receives a good percentage of the total sales, but his real profits are diminished by maintenance costs.

In Figure 3, the third case shows what could happen if the developer sells the marketing rights to a company with a national sales, marketing and product support organization. Here, the service-oriented benefits and the company's reputation enable it to charge \$25,000 for the product.

The pie graphs that illustrate these examples demonstrate a simple concept: a smaller piece of a big pie is often worth more than a bigger piece of a small pie.

Second Product

There is another concern that is not calculated into these examples, but should certainly be considered. In the first two cases, the developer continues to be heavily involved with the product over the five-year period. In the last case, he is essentially free to go on to something else.

If the developer in the third case plans to develop a second product, that product could already be completed and on the market. In the first case, all of the author's time will be spent marketing the initial product; in the second case, a good portion of his time will be spent supporting that

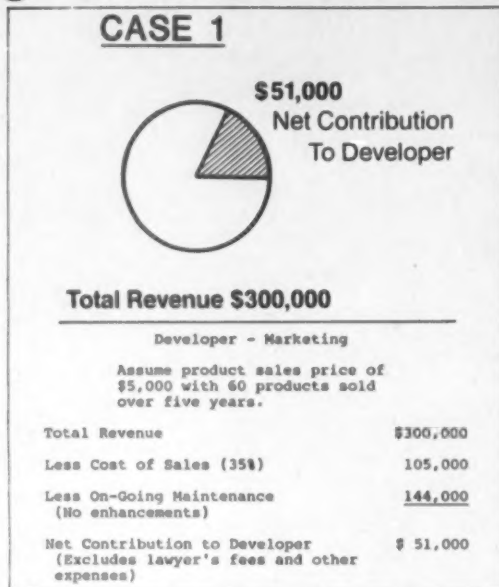


Figure 1

product.

The true financial picture must therefore take into consideration revenue from new product sales in the third case and lost revenue from lack of a second product in the other cases.

While these examples are hypothetical, they do approximate the differences between the marketing alternatives a developer may choose. The most encouraging aspect of these examples is that these profits can be realized because software companies are aggressively seeking and competing for new software products.

It is then entirely reasonable that an author of a software

product can, through careful planning and development, look to an existing software company as a very viable way of turning his investment into profit. However, as with any business venture, success requires more than a good idea with a receptive market.

Beyond that, it is necessary to perform a market analysis

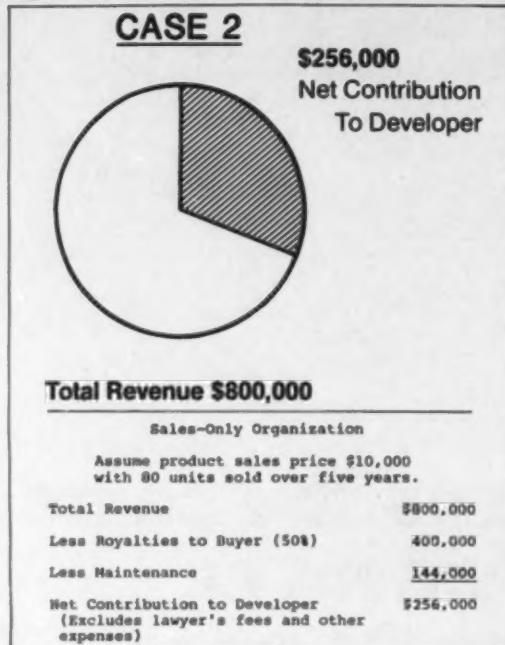


Figure 2

as a base from which to develop a product design that pinpoints features for which users, and therefore a software company, will pay. Success also requires selection of development tools and techniques that ensure the

product's compatibility with the resources of the largest possible user base.

The developer, with product in hand, must then prove his product performs as he claims and present it attractively through packaging and promotion. Further, there is the investment in legal counsel that is needed almost from the project's inception.

And finally, the degree of success depends on negotiating a marketing arrangement that, in the long run, will be as lucrative as possible.

While the profit from writing a computer program will not likely make the author a millionaire, there is a high probability that his time and effort will be more than adequately compensated for.

Probably a higher percentage of independent software authors are driving Mercedes automobiles than are software vendors. In other words, a well-developed software idea represents an opportunity for superior compensation.

Frank, an attorney and former director of corporate development at Boole & Babage, Inc., is a founder and president of newly formed California Software, Inc. in Los Angeles.

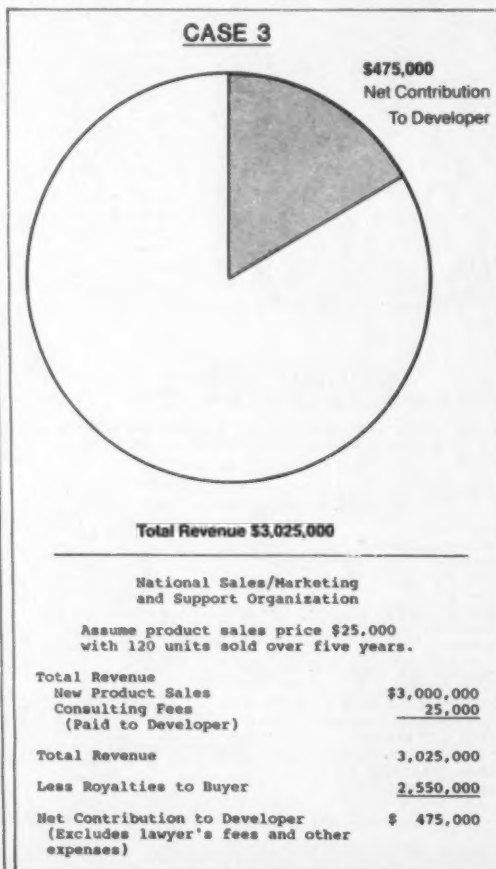


Figure 3

RSTS/E ON VAX ROSS/V (RSTS/E Operating System Simulator for VAX)

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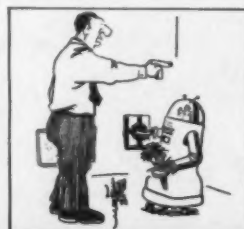
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Know User Needs, Data Base Designers Advised

By Brad Schultz

CW Staff

ANAHEIM, Calif. — Designers of data base systems should know more about end-user realities, according to experts at the recent National Computer Conference session here.

If a designer has to sling hash in a coffee shop for a while to understand a coffee shop's needs for computerized data storage and retrieval, then so be it, consultant Paul Pitt of Cypress, Calif., said.

Although many data base systems of the 1970s have disappointed end users, there is no stopping the proliferation of such facilities among businesses with little in-house technical expertise, the panelists agreed. According to Pitt, the less expertise these systems demand of users, the better they will serve.

Unresolvable Problems

But some problems with data base design may never be solved, IBM research fellow E.F. Codd observed. Redundant data bases spread among nodes of a decentralized data network may be impossible to synchronize, he said, if they are subject to frequent modifications.

Moreover, efficient communication between "application machines" — conventional systems and terminals — and the emerging breed of data base machines is essential to avert degradation of response time, Codd warned.

Sporting megabytes of disk capacity, dedicated processors and file-oriented system software, data base machines will stand separate from host mainframes as data reservoirs for many users in this decade, the panelists noted.

Data Base Models

The data base models implemented in these machines must have a powerful set of operators and safeguards for data integrity to be worthwhile, Codd said. Otherwise, the models would be as useful as a physician conversant in anatomy but ignorant of physiology.

Data base operators are a sort of instruction set that transform one data structure into another. With the relational data base model, which Codd hinted to be IBM's favorite approach, operators produce tables of data from other tables; they do not work on records. Three important relational operators are Select, Project and Join, Codd stated.

The IBMer took a dim view of the two other types of data base models

given broad attention in the DP community: the hierarchical model, which employs the tree as a main data structure and operators such as Get Next; and the Codasyl model, which Codd described as featuring "navigational aids" between records.

Relational Model

Admitting a strong bias toward the relational model he is now helping to perfect at IBM's Research Laboratory in San Jose, Calif., Codd maintained that procedures for ensuring data integrity in the hierarchical and Codasyl models are "very complicated to state."

According to Codd, members of the Association for Computing Machinery's Special Interest Group in Manag-

ment of Data found in 1974 that the relational model needed three statements in high-level language to match the data base support rendered by three pages of code under the Codasyl approach.

Although some researchers have said that relational models permit greater redundancy of data than other models, thus demanding greater storage space at extra cost, such comparisons turn on the nature of the user's application among other considerations, Codd said.

The precision of pointers from one data structure to another, for example, limits the extent to which the user can avoid storing a data item more than once, Codd continued.

The volatility of the user's data may

affect the performance of the system that stores it, Codd said. Data bases that require frequent updates are more difficult to store optimally than data bases that are fairly static and primarily employed in end-user query applications.

Pitt predicted that future data base systems will feature extensive screen programming capabilities, allowing end users to specify what they want done to a data base in rather colloquial terms.

The conference panelists agreed that data base systems would be ubiquitous in the business world by the close of the century. But Codd was alone in predicting that most of those systems would implement the relational model IBM will apparently promote.

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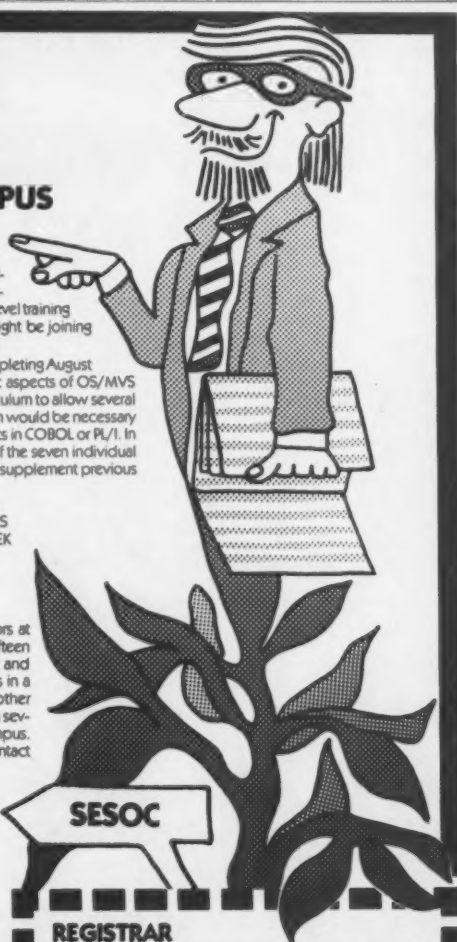
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More information is available from TMSA Seminars, Department C/SCS-N, P.O. 91295, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

User Role Urged in Setting Requirements

(Continued from Page 35)

phase, but should be part of an ongoing design process."

Putting this theory into practice, however, calls for a coalition between manager and technologist — user and developer — which places more responsibility for specifying requirements with the user, the one who has the requirements in the first place.

Yes, this kind of cooperative effort is necessary. But it must be helped along with some kind of strategy that takes into account that the user and developer each have their own and different bases of knowledge, observed Kathryn Heninger, a computer scientist at the Naval Research Laboratory in Washington, D.C.

Chances are the user knows more about the application; the developer is better versed in the technological components of system software design, she added.

Pooled Resources

Drawing on her own experiences with a project to develop flight navigation software for the Navy, Heninger proposed a way for user and developer to pool their resources in a productive way: keep a precise and complete written record of system specifications which is continually modified as requirements change.

While the developer would most likely take the primary role in writing this kind of documentation, users

should take a review role so discrepancies between what the developer thinks the user wants and what he actually needs can be detected and resolved on an ongoing basis.

Built into this procedure, Heninger stressed, is the capability to change the document as users' perceptions of their requirements change.

An important prerequisite for using this technique successfully is that users must know their basic system requirements plus have an idea of what parts of the system will have to change at some future time.

While acknowledging that "users seldom know exactly what they want," Heninger stated flatly that if they don't have at least this basic knowledge, "they have no business asking

you to build something for them."

A kink in the works, however, is that even if users know what they want a system to do for them, they often cannot express their requirements to the developer, Professor Raymond Yeh, chairman of the University of Maryland's Department of Computer Science, pointed out.

A self-proclaimed "interested academician looking at the area of requirements from the Ivory Tower," Yeh suggested that use of a scratch pad can aid the user in pinpointing his software system requirements.

The scratch pad would serve as a place for the user to "exercise the system, even though it doesn't yet exist, and allow him to change his requirements for the system before develop-

ment begins," Yeh noted.

He also stressed the need for requirements specifications to focus on more than just functional requirements because the user's needs go beyond that.

What should also be specified, according to Yeh, are issues relating to the development phase of a project — such as defining constraints and acceptance criteria — and to the maintenance phase — such as anticipated changes and how the system should be designed to make it easily modified in those areas.

Agreeing that functional specifications are not enough, Jensen wrapped up the discussion with this statement: "The standard roll of toilet tissue is actually Kleenex procured under a functional spec."

Math Package Runs on TRS-80

BELLEVUE, Wash. — A symbolic math package for Radio Shack TRS-80 microcomputers is available from Microsoft Consumer Products.

Called Mumath, the package was developed by The Soft Warehouse in Honolulu and is said to provide facilities for algebra, trigonometry, calculus, integration, differentiation and other symbolic operations.

In addition, the package is capable of exact rational arithmetic and automatic algebra simplification. The user can reportedly control such transformations as expanding powers of polynomials and placing expressions over a common denominator.

Mumath requires a TRS-80 with 32K bytes of random-access memory (RAM) and a single disk drive. To use the full package, a 48K-byte RAM system is required.

The package costs \$74.95 from the vendor at Suite 507, 10800 Northeast Eighth, Bellevue, Wash. 98004.

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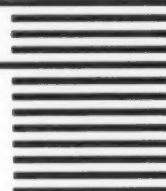
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Flexibility, Freedom Cited User Group Calls for Wider Use of 'Mumps'

By Tom Henkel
CW Staff

ANAHEIM, Calif. — Minicomputer users and universities are not giving the multiprogramming language Mumps enough attention, according to proponents of the language who spoke at the National Computer Conference here recently.

Mumps is more flexible and offers more programmer freedom than other high-level multiprogramming languages, according to Interpretive Data Systems, Inc.'s Paul Egerman, who was representing the Mumps Users' Group (MUG).

Thomas Munnecke, with the Veterans Administration Hospital in Loma

Linda, Calif., said a user can develop a program in Mumps that requires 111K bytes less memory than an identical program written in Cobol. However, he said, executing Mumps on a minicomputer takes twice as long as Cobol on an IBM 370/158.

In addition, using the same program as an example, Munnecke said the Mumps version requires 8% fewer lines of code, 19% fewer conditional operations — such as IF statements — and 6% fewer program control transfer statements like Gotos, according to Munnecke.

While heralded by MUG members as being an extremely efficient applications development tool, Mumps was

also criticized by audience members for being equally difficult to use during program execution.

A spokesman for Tandem Computers, Inc., one of two minicomputer vendors at NCC offering Mumps as part of their product lines, said Mumps eats up a lot of disk storage during execution and often precludes non-Mumps users from using the computer system.

Munnecke said Tandem's problems with Mumps cropped up because that firm is not offering Mumps in its intended form as a stand-alone package. Since Mumps is different, and in his opinion better, than other multiprogramming languages, the language

cannot be offered as part of a multilanguage system — as is Tandem's offering. He added that he doubts if Mumps will ever work up to par in a multilanguage system.

Comparing Mumps to Cobol, Munnecke said Mumps is more of a people-oriented system, offering standard features that are considered optional in Cobol, such as a data base management system, data communications monitors and message formatting monitors. Although those features are not identified as separate entities in Mumps, the capacity to perform those functions is included in the Mumps package, he said.

In addition, Mumps does not require, and apparently does not take well to, linguistic support from peripheral languages common to older operating systems, Munnecke said.

Again comparing Mumps to Cobol running on a 370/158 under IBM's IMS, Munnecke said there are at least 40 Cobol-related languages that can be added to a system. Since each of those languages has its own rules and documentation, the use of multiple languages causes a computer system to become much more complex. Specialists are needed to manage individual parts of the system, and more programmers and analysts are needed to accommodate the expanded demands on the system. With Mumps, those problems are eliminated, he claimed.

Lack of Instruction

Munnecke added that Mumps has failed to gain adequate recognition in the programming community because there are not any universities offering Mumps programming courses.

Egerman supported Munnecke's assessment of Mumps, adding that the language's lack of formality is a boon to programmers.

Taking as an example a mailing list for a hypothetical client and membership directory, Egerman said a programmer could develop a program that would store names and addresses, sort them alphabetically and run checks to ensure a given name had not been used twice.

For example, the programmer could develop the program without knowing the maximum number of organization members; how many mailing labels were to be printed; and the number of characters in the longest name to be printed; the file space and block length to be allocated to the membership list and address data.

Mumps was developed in the late 1960s as part of a federally funded research project at Massachusetts General Hospital in Boston.

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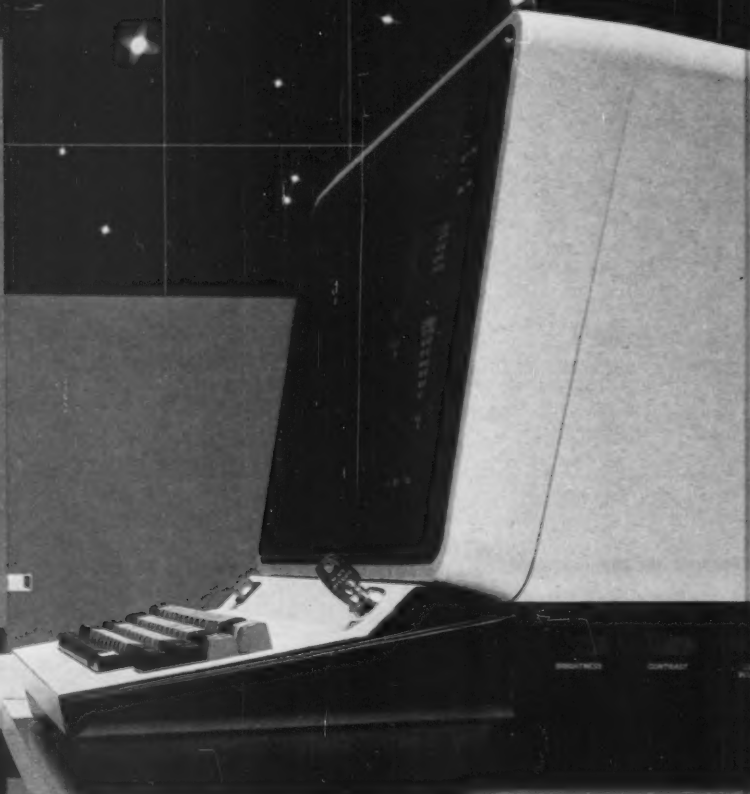


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Fiber-Optic Nets, Satellites

IBMer Sees Transmission Paths of '80s

By Phil Hirsch

CW Washington Bureau

DETROIT — The increasing use of fiber-optic local distribution networks and satellite long-haul circuits should encourage lower processing costs, additional applications and wider computerization in the 1980s, IBM Vice-President and Chief Scientist Dr. Lewis M. Branscomb predicted at a recent conference here.

Both offer digital broadband transmission capacity that is either far more expensive or cannot be obtained at all when older transmission technologies are employed, he explained.

The cost of satellite channels has been falling 40% per year. "The decade-and-a-half since the launching of the first stationary communications satellite has seen a fiftyfold

increase in capacity and a fiftyfold decrease in cost per circuit in orbit per year," Branscomb noted.

Satellites offer distance-insensitive costs, plus the capability for broadcasting messages to any number of earth stations. "They are a natural for computer networks because of the high transmission rates available — as much as several million bits per second."

Also, satellites make new applications possible — teleconferencing, for example. IBM has set up five teleconferencing studios for its own use, he reported. And although "our experience is limited, one location found that three teleconferences a day, with four people participating at each end, would provide payback for their facility in a relatively short time."

During the '80s, "satellites and computers will both play an increasing role in delivering information services directly into homes," Branscomb predicted, adding that "over two dozen videotext services exist or are planned in at least eight countries."

Future Challenges

Although "intriguing and powerful," the prospective advances in terminal and transmission technology "do not, in themselves, provide a complete functional data communications system," according to Branscomb. Integrating the elements poses "challenges."

One of these "challenges" is the need to define "consistent interfaces" that permit attachment of devices to the transmission facility.

Branscomb noted that although international standards covering interconnection at the physical, link and network levels have been promulgated, there is a problem at higher levels. This problem results, in part, because standardization may not be "as practical" since users have different requirements as embodied in different manufacturers' terminal and network offerings.

Rather than a common standard for all manufacturers supporting communications among intelligent terminals at higher interface levels — i.e., those involving applications and output formats — a better solution

(Continued on Page 48)

Antiquated Technology Blamed For Stalling Use of Mini Nets

By Tom Henkel

CW Staff

ANAHEIM, Calif. — Despite improved systems technology, the prospects of efficiently using minicomputers in networks linked via telecommunications lines is still rather dim, according to telecommunications consultant Dan Zatyko, of Zatyko and Associates.

Speaking before participants at the National Computer Conference here, Zatyko said improved minicomputer technology that offers relatively cheap DP is being hampered by antiquated telecommunications technology.

Common telephone lines, the staple of many distributed systems, have not changed since 1934. In addition, the protocols used to link minicomputers with a mainframe host are leftover from the late 1960s, Zatyko noted.

The solution to the problem, he said, is for host computer vendors to improve the software links between minis and larger hosts from diverse vendors. Some vendors have developed improved software to link smaller systems with their own larger mainframes, but when the user tries to link small systems to another vendor's mainframe, the user is forced to go back to antiquated standards.

Digital Equipment Corp. and Hewlett-Packard Co. were mentioned specifically as vendors who have improved software for their own systems, but not for that of other vendors.

Telephone lines are another big problem in transmitting data. Frequencies between 300Hz and 3,300Hz for telephone lines were

determined by the Communications Act of 1934, and have not been updated since, Zatyko said.

The antiquated telephone frequencies are error-prone and force users to install software emulators to compensate for the prob-

(Continued on Page 52)

Proposed Domestic Telex' Rates Lower Than Western Union's

By Phil Hirsch

CW Washington Bureau

DETROIT — Intertext, a proposed domestic telex service that reportedly will offer rates lower than those charged by Western Union International, Inc., was announced here by ITT Domestic Transmission Systems, Inc. (ITTDTS) at the International Communications Association's (ICA) annual conference. Federal Communications Commission approval is required before the service can begin.

Initially, Intertext will link five cities, but 26 will be on-line by the end of this year, the company said. The five initial cities are Boston, Chicago, Detroit, Houston and Los Angeles.

Intertext rates are distance-insensitive. During business hours, the service will cost 32 cent/min for domestic transmission. At other times, the charge will be 20 cent/min.

Intertext also includes domestic access to international telex networks. The proposed rate is 16 cent/min during business hours

and 10 cent/min otherwise. In all cases, the user is also charged \$25/mo. for the switching portion of Intertext service.

Intertext Features

International telex messages will be routable, via Intertext, to all four of the U.S. international record carriers (IRC), John Reynolds said at a press conference announcing the offering. He is president of U.S. Telephone and Telegraph Corp., the parent company of ITTDTS. U.S. Telephone, in turn, is a subsidiary of International Telephone and Telegraph Corp. (ITT).

Other features of Intertext are:

- Store-and-forward and speed/code-protocol conversion.
- Abbreviated dialing, automatic redialing, automatic answer-back and "sequential call placement" — an arrangement that allows multiple calls to be made during a single transmission.
- Departmental billing, which includes the

(Continued on Page 47)

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Vast Improvement in Facsimile Seen by '85

By Phil Hirsch

CW Washington Bureau
ANAHEIM, Calif. — Solid-state devices, lasers and fiber optics will produce a massive improvement in the cost-effectiveness of facsimile equipment in the next four to five years, John E. Cochran of Qwip Systems predicted at the

National Computer Conference here recently.

Addressing a session on electronic mail, Cochran also cited the recent announcement of an analog microprocessor as a significant technological development.

Facsimile printing and storage will be among the func-

tions most affected by these new components, he explained. Laser printers, for example, along with precision matrix, ink jet and improved thermal printing techniques will permit outputs of up to 45,000 line/min. "Advanced machines will be capable of making multiple copies upon receiving remote commands," he added. They will also "make use of an electronic overlay technique [allowing] users to transmit the variable information only, thus reducing communications time and cost."

Data compression, magnetic bubble memories and possibly laser/optical memories will continue to push storage costs downward and lead to practical store-and-forward facsimile delivery systems, Cochran said.

Modem Costs

While subminute facsimile transmission at up to 9,600 bit/sec over dial-up telephone circuits is now widely available, the high cost of the modems is a major reason for the high cost of the terminals. The new analog microprocessor is likely to reduce this expense significantly, Cochran said, making digital fax feasible for a much larger group of users.

Another spur to wider use will be adoption of standard communications protocols for digital fax equipment. Utilization of dissimilar protocols in some facsimile products has

limited the "natural" expansion of the digital fax market that "could have otherwise been experienced" in recent years, he contended.

Cochran believes the new technology will lead to widespread use of "multifunction office terminals" providing facsimile and a number of related services.

Terminal Capabilities

"This terminal will be capable of resolution in excess of 300 line/in., producing correspondence-quality copy. The unit will also interface with ... word processors, TWX/Telex and electronic data processing devices, [becoming] a shared scanner-printer with both text and graphic capability. The terminal will provide local photocopying and will have storage and retrieval capabilities as well," he said. In addition, it will "minimize communications cost by permitting after-hours transmission of data through the use of an auto-dialer and a store-and-forward

option, as well as allowing for the utilization of value-added networks."

Key Benefit

The key benefit of the multifunction terminal, however, will be its ability to accommodate both text and graphics. Facsimile is the only technology that offers this service, Cochran pointed out. It makes possible transmission and hard-copy generation of "an infinite variety of data" from original documents, DP systems, word processors or other facsimile terminals.

Terminals with several of the above functions are already on the market, he added. "For example, the IBM 6670 utilizes a laser printer, has multiple-copy capability, can transmit receive over ordinary phone lines and will interface to the IBM 370 and the IBM Mag Card II typewriter. Although the 6670 does not currently perform graphics or accept facsimile input, ... graphics capability could be easily added."

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By Standardizing Interfaces

Researcher Advises Planning Ahead for DDP

By Jeffery Beeler

CW West Coast Bureau

ANAHEIM, Calif. — Any user contemplating a move into distributed data processing (DDP) should begin now to develop a coherent plan for tying its remote and central computing sites together into a single network, according to the Yankee Group, Inc.'s research director, Dale Kutnick.

Such a plan will prove indispensable if a user expects to eliminate its system incompatibilities and permit communications between different vendors' products, Kutnick said during a recent technical session at the National Computer Conference.

One of DDP's major challenges during the 1980s will be to interconnect the hodge-podge of incompatible minicomputers and terminals the typical large systems user has amassed during the previous two decades.

But to surmount that hurdle, a user first must standardize its interfacing requirements, Kutnick said. Otherwise, networking — and therefore distributed processing — will prove impossible.

Net Control

Another key DDP issue facing users during the 1980s will be the question of network control and management, Kutnick said. How will computing power be allocated among remote and central computing sites? Who will do the systems and application programming, and who will exercise authority to make DP decisions?

Speaking during a session entitled "Keys to Distributed Processing," Kutnick told his listeners that distributed processing networks are three to

five times more difficult to implement than batch systems. "If you can't manage a batch shop, distributed processing will be a nightmare."

In addition to reconciling product incompatibilities and settling the network control issue, users of DDP systems have to contend with extremely high system and network development costs and conduct extensive user education programs to compensate for the shortage of DP professionals.

Users of DDP networks also face the problem of having to maintain a different programming staff for each type of hardware operating throughout their organizations, Kutnick said. In addition, the presence of computer-

trained personnel at widely dispersed sites increases a distributed system's vulnerability to security breaches.

Work Continuity

But despite distributed processing's obvious drawbacks, many users still find the concept highly appealing. Part of distributed processing's popularity lies in its ability to protect remote users from work interruptions, Kutnick said.

When computing remains centralized, a hitch as simple and common as a line failure can bring operations at a remote DP installation to a standstill. But with distributed processing, a problem with a central mainframe will

usually leave remote computing activities largely unaffected.

In implementing a distributed processing network, users should define their operating procedures as fully as possible to ease the burden on remote site users, most of whom lack formal DP training, Kutnick said.

Distributed system implementors should also:

- Ensure that their host and remote processors communicate in batch mode to minimize transmission costs.
- Disperse about 80% of their processing load to remote sites and keep only the remaining 20% centralized.
- Insist on central control and maintenance.

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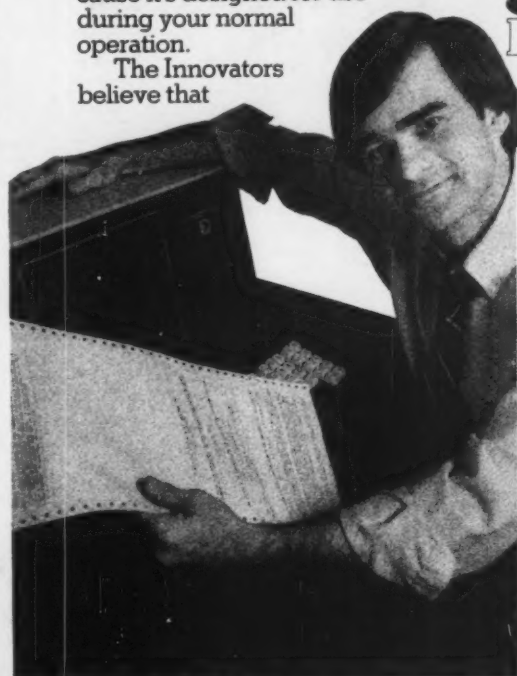
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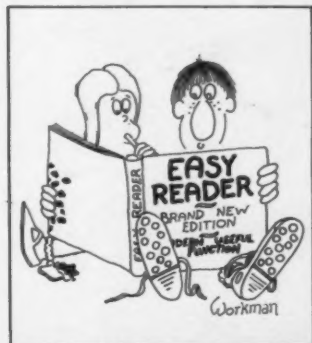
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Proposed Telex To Lower Rates

(Continued from Page 45)

may be "system gateways," Branscomb said. These gateways would contain software "transforms" that would allow one manufacturer's system to talk with others.

IBM recently submitted a paper describing the system gateway concept to the European Computer Manufacturers Association, one of the groups involved in development of international network interface standards.



'See Jane. See Spot Run. See Dick Implement a Multidirectional Information Processing System in Unilateral Language Program Application ...

Pitfalls of Communications Management Cited

By Brad Schultz
CW Staff

DETROIT — A communications manager should keep his staff constantly educating itself, talk like a businessman and avoid polluting society, according to the man who held that position at Bank of America for four years.

The average corporate manager of communications can read two or three books per month to stay apprised of technical developments, Rui R. Lopes told a session of the International Communications Association Conference here recently. Before starting a Sunnyvale, Calif., consulting practice, Lopes managed a \$90 million communications budget for Bank of America.

Communications specialists need to absorb fast-breaking trends and issues through reading and attending professional conferences, seminars and courses, Lopes said. Otherwise, they will lose value rapidly as the technology stretches to encompass DP, word processing, voice and other forms of information flow.

Profits, Not Costs

Rusty communications managers may lose control over the next generation of systems specialists, weaned on personal computing and Viewdata-type services, as they start handling integrated information flows in the 1980s, Lopes warned.

Top management will frown on requests for systems upgrades and resource expansion unless the communi-

cations manager can articulate them in business, not technical, terms. State what the proposed system will do for the company, rather than its costs, Lopes advised.

Return-on-investment and cost benefits concern the communications manager's superiors, not the technical details of the proposal, he explained. The manager should provide estimates of how much money new facilities will make, not spend, for the company and present them as resources rather than extended overhead.

Today's technocrats largely ignore the social consequences of proliferating systems, Lopes observed. Just as the petroleum and automotive industries polluted the air through negli-

gence, the information processing community may pollute the quality of life unless the human impacts of implementation are considered.

Integrated Channels

As the various information flows are integrated through the emerging class of supercontrollers, management of those flows must also be integrated. For companies with extensive network traffic, the communications manager may wrest authority over the various processing functions from the manager tied to computing operations, he indicated.

Whoever gains ultimate authority over integrated channels should participate actively in corporate strategy

making, Lopes said, since a firm's direction may well hinge on the success of its information exchange resources. That means he should probably be a senior vice-president with considerable clout in the organization.

At present, however, communications managers can expect "years of humiliation" before most corporate chiefs, who generally view technical administrators as pests who constantly demand greater allocations of money, Lopes concluded.

Technical matters will be less important to communications managers than political, economic and psychological aspects of networking in the years ahead, Lopes predicted.

IBMer Predicts Transmission Paths of '80s

(Continued from Page 45)

date and time of each call and the number of chargeable minutes. "Fractionalized billing" will also be provided so that multiple calls made during a single transmission can be billed to separate departments.

Initially, Intertext will include private leased line service at up to 300 bit/sec. The first public service will operate at 50 bit/sec, but upgrades to 110-, 300- and 1,200-bit/sec are planned before the end of this year, Reynolds said.

"We also plan to add the growing base of communicating word processors, and the millions of data terminals — such as IBM's 3270 and 2780 as well

as others from such companies as Wang Laboratories, Inc. and Datapoint Corp. — to the equipment base served," he added. These enhancements will enable ITTDS to offer electronic mail.

Intertext users will be able to interconnect through their own terminals or through equipment provided by ITT World Equipment, Inc., a newly formed leasing and maintenance firm.

Dissatisfied Users

A recent ITT survey found that many users are dissatisfied with present telex service, "particularly with respect to issues of network reli-

ability, and practically all of them would seriously consider a new service," Reynolds said.

Intertext addresses this concern by providing a fully redundant network, computerized switching facilities available around the clock and emergency backup power supply, he added.

Other products and services announced by ITT at ICA include Omni VI, an "integrated communications system that combines message switching, communications control, word processing and electronic message transmission in a single business facility." It will be offered by ITT World Communications, Inc.

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Encryption Committee to Meet

WASHINGTON, D.C. — The newly formed X3 Technical Committee on Data Encryption will convene its organizational meeting at the offices of the computer and Business Equipment Manufacturers Association (Cbema) on June 12 at 10 a.m.

Named the X3T1 committee, the group will write a draft American

National Standard (ANS) on the modes of operation for the ANS Data Encryption Algorithm currently being rebalotted. Participation from producers, users and general interest groups is being sought.

Cbema, which serves as secretariat to the X3 parent committee of X3T1, is located at Suite 1200, 1828 L St., N.W., Washington, D.C.

Fast Communicating Copier Unveiled at SBS Facility

RESTON, Va. — Satellite Business Systems (SBS) recently demonstrated a high-speed communicating copier system the company plans to integrate into its satellite communications system, slated for first operations early next year.

Unveiled May 14 at the SBS test facility here, the digital system is based on computerized scanning and reproduction units developed under an SBS contract by AM International.

The AM International device, using laser scanning technology, can read one page every two seconds and reproduce 70 pages per minute. A control unit based on a Digital Equipment Corp. PDP-11 handles the copier-to-communications interface, data storage and store-and-forward features of the system.

Transmission speeds over the SBS network were given at 448K bit/sec. AM International said its scanner-reproduction hardware will eventually be offered to non-SBS customers with system design, including processing and storage capacities, tailored to individual user needs.

The first SBS satellite is scheduled for launching in October. The IBM, Comsat General Corp. and Aetna Life and Casualty partnership recently cleared legal challenges to its Federal Communications Commission authorization. The SBS network is expected to initially attract large organizations.

The communicating copier system,



Robert C. Hall (left), president of Satellite Business Systems, checks out document communications system as Roy L. Ash, chairman of AM International, the firm that developed the device, looks on.

the first of its kind, according to SBS, is in line with the company's plans to offer full office-of-the-future services, SBS said.

At the system demonstration, AM International Chairman Roy Ash said, "Contrary to some earlier crystal ball views of the office of the future, not a single shred of evidence suggests that it will be a paperless office."

"CRTs, back-desk data terminals and systems intelligence notwithstanding, there will continue to be lots and lots of paper," Ash said.

Telecrafters Brings Out Color Graphics Terminal

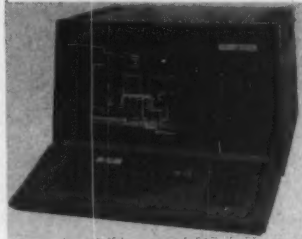
HARRISBURG, Pa. — A desktop graphics terminal targeted for applications ranging from color text displays to full graphics displays for data analysis, computer-aided design, network management and process control has been introduced by The Telecrafters Corp. here.

Designated the CDT-7001, it is organized as a semigraphics or character-oriented terminal with an optional full-graphics point-addressable overlay. Communications is programmable from 110- to 9,600 bit/sec, half- or full-duplex, in asynchronous or block transfer mode.

High-Resolution CRT

A 13-in., high-resolution CRT displays 80 Ascii char./line by 48 line/page.

The optional eight-color graphics overlay has a resolution of 512 by 256



Telecrafters' Model CDT-7001

and features an 8K-byte program buffer.

Single-unit prices range from \$6,600 to \$12,000, depending upon the options selected, and quantity discounts are available. Delivery time was quoted as 60 to 90 days by The Telecrafters Corp., 999 Pieffers Lane, Harrisburg, Pa. 17109.

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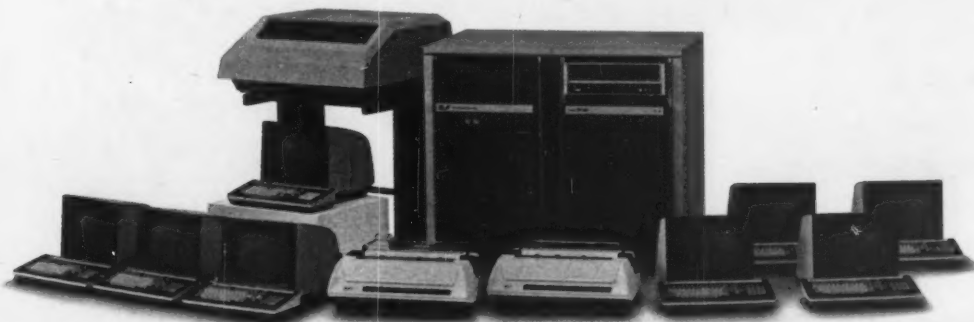
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Relocation Set for Dallas University Supports ICA Training Program

By Brad Schultz
CW Staff

DETROIT — Worried that the nation lacks adequate educational programs for telecommunications professionals, the International Communications Association (ICA) will move its headquarters from Houston to Dallas, where Southern Methodist University will support a major ICA effort toward improved training resources.

Many firms cannot ensure

that communications personnel keep up with technical developments, ICA's executive director, Dr. H. Charles Baker, told the association's annual conference here recently.

Baker called Southern Methodist a pioneer in educational programs tied to industrial participation. The university has reportedly developed a set of college credit courses in telecommunications management, available on videotape.

The move does not reflect a reduced relationship between ICA and other educational institutions, the former Exxon Corp. manager emphasized.

Identity Crisis

In a speech on professional development, Baker said that an "identity crisis" plagues those who administer corporate communications facilities. The crisis has many symptoms, he added.

These were said to include a lack of recognition by the public, top management and the communications professionals themselves; inadequate training resources; a shortage of people entering the profession; and the lack of a defined career path for those who do.

Communications managers do more than supervise tech-

nical personnel, Baker pointed out. They administer a process subjected to a host of political and economic problems and will be more important to their organizations as networks grow in sophistication.

But top executives and the public largely fail to see that importance. Probably most ICA members describe themselves as "engineer" or "administrator" on their income tax forms, he suggested, because they do not expect the government to understand what communications managing really is.

A scarcity of genuine telecommunications departments in the nation's universities has restricted the numbers of people entering the profession, the ICA official continued.

There are no quick remedies for these problems, Baker

said, but the ICA recently launched a threefold attempt at a long-range solution.

Comprehensive Program

In concert with Southern Methodist and separate from the annual conferences, ICA has started a "comprehensive educational program" that will offer videotapes and other training aids to subscribing organizations.

The move to Dallas will probably be completed this year. Southern Methodist was said to have a master's degree program in telecommunications and a range of courses in the field, taught to students in two foreign countries and several states of the U.S.

For more information, Baker can be reached at P.O. Box 10013, Houston, Texas, 77206.



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Prospect of Mini-based Nets Seen Stalled by Antiquated Technology

(Continued from Page 45)

lem, he noted. Older large mainframe hosts also present a stumbling block in setting up a minicomputer network. Host computers "carry the sins of the past" because their architecture forces a dependence on multiple levels of software to connect a user at a terminal to the data stored in the mainframe.

As technology has improved and more minicomputers are being used at remote sites in a distributed network, many mainframes have chosen simply to build software emulators to handle the changing technology, rather than to change modules inside the system. The reason many mainframes have avoided changing modules is because that method could lead to major internal changes to an older CPU, Zatyko said.

Another problem that has hampered minicomputers in distributed networks is that most minicomputers require asynchronous terminals, according to Rodger Evans of Micom Systems, Inc.

Black Boxes

In order to make minicomputers work up to peak efficiency in a telecommunications environment, vendors will have to build at least four "black boxes" designed to improve the telecommunications process, Evans said.

The necessary hardware and software combinations include an error controller, a data concentrator that will serve as a cluster controller for multiple terminals and a multidrop concentrator, which is a larger version of the cluster control-

ler used to multidrop dumb terminals (ones without protocols) on a telephone line. In the latter case, the concentrator would do all the necessary polling, Evans noted.

As an alternative to telecommunications, Dan Gellern, president of Printer Terminal Communications Corp., suggested that users in the future may be able to turn to radio waves as a means to transmit data.

Citing as an example a simi-

lar system used by the *Los Angeles Times* to transmit alphanumeric information from various locations throughout California, Gellern said that system could be adapted to accommodate digital information as well.

In addition, Gellern noted the increasing use of cable television lines as another possible means of transmitting data. In both cases, data could be transmitted only over a short area, less than 100 miles.

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Model 43 to Execute 1.6 Mips

Magnuson to Upgrade Largest Processor

By Jeffrey Beeler
CW West Coast Bureau

LOS ANGELES — Magnuson Systems Corp. plans within the next year or so to upgrade its largest IBM-compatible mainframe to execute roughly 1.6 million instructions per second (Mips), according to Carlton Amdahl, the company's executive vice-president of technology.

The upgrade would mean a more than 40% jump in execution speed for the Model 43, Magnuson's top-of-the-line M80 series system, which is currently rated at 1.1 Mips.

A second upgrade to the M80 family is contemplated for mid-1982 when Magnuson's high-end system's performance is expected for the first time to reach 3 Mips, Amdahl predicted here recently at a one-day seminar sponsored by Magnuson.

Circuitry Rearrangement

Much of the projected increase in execution speed will probably be achieved through a fairly simple rearrangement and repacking of Magnuson's mainframe circuitry, Amdahl explained.

Under the proposed rearrangement, chips that in the past have occupied widely separated circuit-board positions would be stacked in rows like crackers in a cellophane wrapper or slides in a slide projector's carousel. Wires running along the sides of the stacks would then connect each device's pins to the pins of every other device in the row.

Such a circuit arrangement would shorten the distances electrical signals would have to travel between the various components and thus would speed the internal operation of Magnuson's M80 upgrades, Amdahl said.

Earlier during the seminar, Amdahl told an audience of M80 users and prospective users that customer shipments of the company's latest products, the M80/42 and 43, are almost ready to begin. His remark suggests that Magnuson will probably meet its year-old goal of having the two top-of-the-line systems primed for delivery by the second quarter of 1980.

Amdahl also told his audience that the models 42 and 43 would incorporate emitter-coupled logic (ECL), unlike the older and less powerful models 3 and 4, both of which use transistor-transistor logic (TTL). The substitution of ECL for TTL will enable the M80/43 to operate twice as fast as the M80/4 without boosting the larger

machine's power requirements, Amdahl said.

Strategic Architecture

In other remarks, Amdahl described Magnuson's underlying product philosophy as a "radically different way of looking at the world."

Unlike many other vendors, whose products derive most of their performance advantages from leading-edge semiconductor technology, Magnuson uses standard, off-the-shelf components and circuitry, which it then incorporates into a so-called "strategic architecture."

In Amdahl's view, strategic architecture holds the key to the whole M80 product line. Basically, the Magnuson-coined term refers to a simple design approach in which each of the three main processor elements —

input/output, main storage and the CPU itself — are in effect broken into separate pieces and interconnected through a central, minicomputer-like bus structure.

This emphasis on a high degree of modularity allows Magnuson to track IBM's product moves quickly and easily because it makes each of the three processor subsystems independent of design changes in the other two, Amdahl said.

With most other vendors' mainframes, by contrast, the constituent subsystems are so intricately and thoroughly interwoven that an internal change in even just one processor sector often forces its supplier to completely redesign all the other sectors as well.

Magnuson's modular architecture also allows the company's systems to adapt easily to successive generations of semiconductor technology, Amdahl added.

Printer Vendors Exhibited Few New Offerings at NCC

By Rita Shoor
CW Staff

ANAHEIM, Calif. — While the clatter of printers made a significant contribution to the decibel level at the National Computer Conference here recently, relatively few new products were announced by the peripheral vendors.

Both Facit Data Products and Diablo Systems, Inc. were displaying printers which had been introduced at the Hanover Fair in Germany last month. "There is a huge market opportunity in Europe and the economy is a little cool here," according to Rigdon Currie, vice-president of marketing for Diablo.

Diablo was featuring its Model 630 daisy-wheel printer with print speeds of up to 40 char./sec for a 128-ASCII-character set. The 630 features a standard RS-232C interface operating at switch-selectable speeds of between 110- and 9,600 bit/sec. Priced at between \$2,700 and \$2,800 in OEM quantities, the printer offers interchangeability between metal and plastic printwheels to suit the user's application.

Facit's 4520/4521 printers, new to the U.S. market, feature a throughput speed of 60 line/min for a 94-character set in a 9 by 7 dot matrix. Line spacing is 6 line/in. and

printing speed is specified at 100 char./sec at 12 char./in. The end-user list price was quoted at \$998, with an OEM single-unit price of \$898.

Facit also introduced the Model 4542 printer, which operates in three modes — text printing; grey-scale mode for printing pictures; and graphics mode. An upgraded version of the 4540 model, which only offers character printing, the 4542 offers a two-color (red and black) ribbon with 90- to 390 line/min throughput in a 9 by 14 dot matrix representation. RS-232C serial and parallel interfaces are featured with a programmable serial interface for mainframe hookup.

Although pricing for the 4542 has not yet been established, Berndt Stridh, product manager for Facit, estimated that it would be in the \$35,000 to \$40,000 range, depending on the interface selected.

Band Printer

Centronics Data Computer Corp. introduced a Model 6080 band printer that supposedly reduces operational noise levels to less than 60 decibels.

Printing speed for the 6080 is 600 line/min, and 48-, 64-, 96- and 128-character

(Continued on Page 54)

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Color Graphics Displays Draw Crowds to IBM Booth

By Rita Shoor
CW Staff

ANAHEIM, Calif. — Color graphics was the name of the exhibitors' game at the National Computer Conference here recently, and the crowd under the blue and white IBM logo in the South Hall was consistently large and uniformly drawn to the full-color displays on that vendor's CRTs and printers.

Two Model 3287 printers and two Model 3279 CRT terminals were being driven by a 4341 processor, and the conference attendees seemed torn between staring at the images on the CRT terminals and requesting copies of the graphs being printed on the four-color 3287s.

Why the fascination with the IBM display? That was the question put to a random sampling of observers.

"I'm interested in seeing how vendors get good-quality reproduction on four-color printers," was the response

from L.E. Coale, section manager for McDonnell Douglas Automation Co. "It's easy to get good color on the terminal; the problem is getting a good hard copy." Coale rated the 3287 as producing "fairly nice quality graphics ... but it's a little slow."

David Jordan, a systems engineer with Data General Corp., was "very impressed with the graphics printer," but he acknowledged that he hadn't seen any others yet.

"I'm a computer broker ... I buy and sell IBM equipment and I'm interested in anything they do," was the reason Rob Darcy, a marketing representative for Source Data Products, gave for his presence at the vendor's display.

Page Printer Prototype Uses Magnetic Imaging

By Rita Shoor
CW Staff

ANAHEIM, Calif. — A manufacturing prototype of a page printer using a magnetic imaging technique to print up to 8,000 line/min was introduced by General Electric Co. here.

Michael Shelor, a product support representative, was careful to call the Terminet 8000 a "technology announcement" rather than a new product introduction.

The product was developed to replace impact line printers for time-sensitive high-speed printing applications in businesses that might generate an average of 250,000

page/mo but cannot justify the purchase of nonimpact laser printers.

The 8000 model has a 94 upper- and lowercase ASCII character set with resolution of 120 dot/in. Horizontal character spacing ranges from 10- to 15 char./in., and vertical spacing of 6- or 8 line/in. is available.

Although the company is gearing the product toward a computer room environment, its low noise level may make it attractive to users in an office environment.

The projected price for the Terminet 8000 printer will be "somewhere under \$20,000 in OEM quantities," Shelor said.

Few Printers Make Debut

(Continued from Page 53)

bands in a variety of character sets are offered. End-user price for the printer is \$7,695 with OEM quantity discounts available. Shipments are projected for January.

An upgraded version of the Centronics 703 printer featuring a graphics package was also announced. The 703-G switches from a primary character set to a secondary set capable of doing limited graphics applications.

Among the printers being exhibited by Qume Corp. which were drawing interest was the Sprint 5 wide-track model which can print up to 400 columns across a page at 15 char./in. Featuring a 96-ASCII-character set, the model was designed for reports that might require many headings such as a stock transfer application in which the user wishes to see the entire transaction on one line. End-user price for this model is \$2,995.

Mannesmann Tally was drawing interest by offering the 1980 schedule and the 1979 record of the football team of your choice, printed on its T-1612 two-color printer. Capable of printing text at 6 line/in. and labels at 8 line/in., the 1612 is part of a series which ranges in price from \$1,995 to \$4,925.

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After 'More Homework'

Nanodata Reintroduces IBM-Compatible CPUs

By Rita Shoor
CW Staff

ANAHEIM, Calif. — A series of IBM-compatible processors was introduced — for the second time — by Nanodata Corp. at this year's National Computer Conference here.

"Essentially the same systems" were introduced last year, William Zareco, vice-president of field operations, acknowledged, but the company withdrew the earlier announcement and "did more homework" to come up with a series that is directly competitive with IBM's 4331, 4341 and 370/148 mainframes.

Designated the QMX 6333 series, the family includes three models: the

QMX 6333 at the low end, with main memory ranging from 512K to 2M bytes to compete with the 4331 Model Group 1; the QMX 6336 with main memory capacity from 1M to 4M bytes, one integrated byte multiplexer channel and two block multiplexer channels on the standard machine positioned against the 370/148; and the 6343 processor with 2M bytes to a maximum of 4M bytes and a maximum of eight block multiplexer channels in competition with IBM's 4341.

The charter of the group that designed the system's architecture was to "provide IBM 370 plug-compatibility to begin with," Dr. Gideon Frieder, a company spokesman, noted. A 4331

processor was utilized when Nanodata was carrying out its performance benchmark testing.

IBM Price Axis

When asked about the effect of IBM's decision to charge for its operating systems, Zarecor stated that "anything that raises the price/performance curve is welcome . . . it's an indication that IBM may be moving to a general raising of the price axis."

The QMX series will be sold to both the end-user and OEM markets in the U.S., and Nanodata is in the process of negotiating with some European companies for distribution in that market. In addition to IBM plug-compatibility,

the 6300 series is compatible with the following IBM operating systems: DOS, DOS/VS, DOS/VSE, OS/VS1, VM/370 and OS/VS2 (SVS and MVS), the company said.

The product line is being offered initially without peripherals. Pricing for the QMX 6333 will range between \$98,000 and \$123,000 with projected availability of January 1981. The 6336 model costs from \$163,000 to \$212,000, depending on channel requirements and main memory purchased, and is available with 90 days of lead time.

The 6343, said to be available in the second quarter of 1981, will range in price from \$235,000 to \$282,000 and will be "approximately 10% cheaper than the 4341," according to Zarecor.

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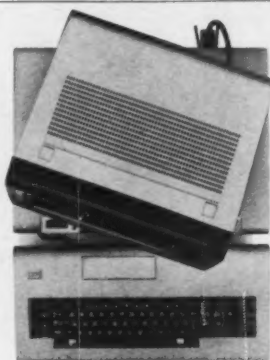
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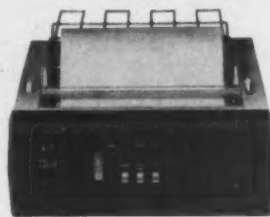
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System Controls Bee Breeding in West Ireland

DUBLIN, Ireland — "We are on the way to achieving an Irish bee, dark in color, strong in wind and hopefully with a well-developed ancestral memory."

With the aid of computers, such goals will be met in this northern country, and "we will efficiently overcome the cold, windy, damp climate of our region," according to Peadar O Riada, joint managing director of Mil an tSulain, a major bee breeder on Ireland's west coast.

The source of such an accomplishment is Gaeldata, an Irish west coast computer consultancy that produces, markets and maintains commercial packages such as payroll and ledgers, as well as its "production control system for beehives."

The Dublin-based MDS Data Processing Ltd. Series 21/40 computer system at Mil an tSulain has three diskette drives, 64K bytes of memory, a CRT and a 2141 printer. The "input vetting" program designed for this system was written in Mobol, MDS' business programming language.

With more than 600 hives in separate apiaries spread over two west coast counties in Ireland, Mil an tSulain's goal is to build up its apiary numbers to thousands of hives by the mid-1980s and to be one of the largest bee-producing units in the world.

Commercially, beekeeping can be a multimillion dollar industry. With good management each hive can produce up to \$250 worth of produce annually. Besides honey, products in-

clude propolis, royal jelly, wax, the bees themselves and queens mated by artificial insemination.

Master Records

One of the major factors affecting bee production is the bees' environment. Each hive has a master record on the MDS Series 21 indicating such things as the height of the hive above ground level, local farming and planting forecasts, make of hive, the material of which it was constructed and the type of countryside.

Changes in the environment — such as farmers plowing fields or planting crops — can drastically affect the type and quality of honey produced.

For example, if a farmer raises a crop of kale near some hives, the bees feed-

ing from that kale will produce crystallized honey. If not harvested within three to four days that honey will have a detrimental effect on the bees the following winter.

Since the hives are usually clustered in groups of 10 or more, each one's position within the group is also recorded on the master record. The input for each hive's master record comprises 38 data fields with more than 100 variables.

Gaelic Software

A feature of the software for Mil an tSulain is that all the input and all output via CRT and to the printer is in Gaelic, which is the first language at Mil an tSulain.

Kevin Gallagher, Gaeldata's consultant, is himself an apiarist and speaks Gaelic. "This project was uniquely mine," he said. "I must be the only Irish-speaking beekeeping computer consultant around."

The software, in fact, was designed so that a language change is a very simple operation and can be accomplished during job setup, he noted.

In addition to the relatively short-term commercial aims, the system will help toward developing a strain of bees more suited to Ireland, as noted by Mil an tSulain's Peadar O Riada.

Reader-Sorters IBM-Compatible

ELK GROVE VILLAGE, Ill. — Plug-compatibility with IBM and "IBM-type" mainframes was introduced by Cummins-Allison Corp. for its models 6290 and 6292 high-speed reader-sorters.

The products were formally introduced at the American Banking Association Operations and Automation Conference recently and were designed to fill a void in on-line check processing that IBM has been "unwilling or unable to fill," according to Tom Walsh, vice-president of marketing, Data Systems Division.

"Many check processors... consider their existing [IBM] 1419 reader-sorters inadequate in terms of their present requirements. The 1419 machines can't be upgraded to add endorsing, ink-jet printing, microfilming or pocket expansion. Their only alternative is replacement by the IBM 3890" and it is with the Model 3890 that the Cummins-Allison reader-sorters will directly compete, he implied.

Among the features offered by the 6290 and 6292 are pocket expansion capability up to a maximum of 34 sort packets and the ability to add ink-jet printing and microfilming or to incorporate a dual Micr/E13B optical character recognition compare-read system to enhance Micr read rates.

The reader-sorters reportedly operate at rates of up to 1,400 item/min and are equipped with microprocessors to allow for emulation of the IBM 1419, performance of off-line diagnostics and Micr field validation.

Cost of the reader-sorters ranges from \$160,000 to \$240,000, depending on the options selected.

Cummins-Allison's Data Systems Division is located at 2121 Landmeier Road, Elk Grove Village, Ill. 60007.

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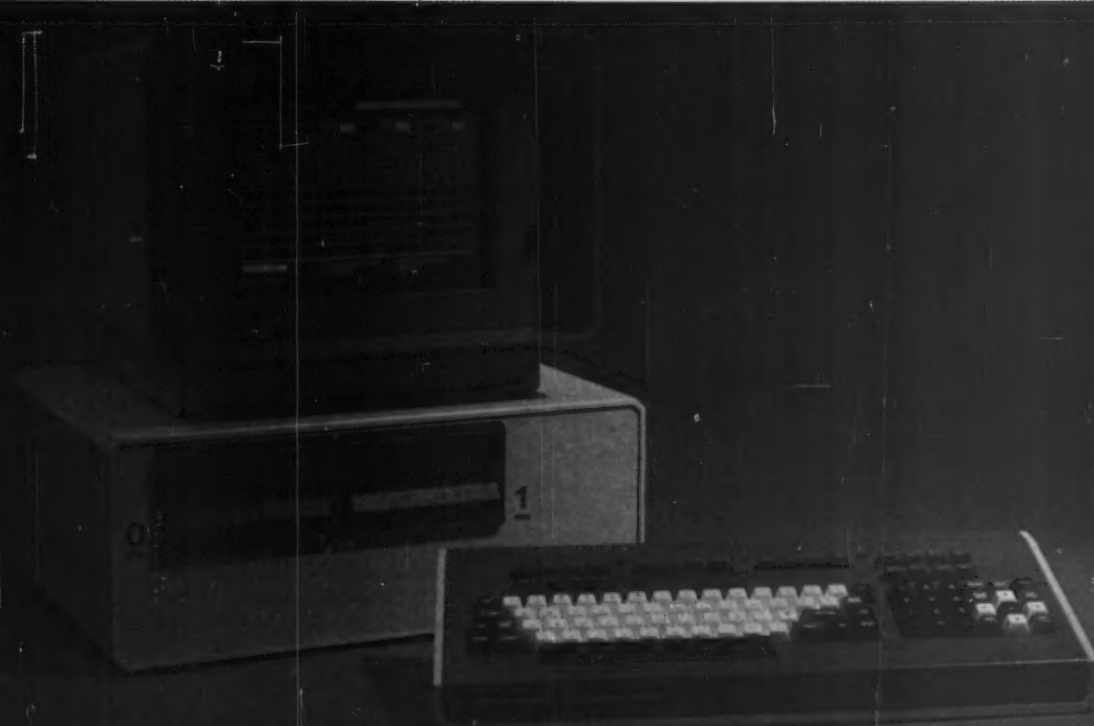
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*Quantity prices start at \$5,883 each for five units, the minimum factory order, with 16KB of main memory (32 and 48KB available) and two microfloppy disc drives. Each drive has its own controller and DMA channel. Availability: 60 days.

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The Perkin-Elmer 3500 handles multiple functions at the same time, maximizing operator productivity. The operator can enter data as the terminal verifies it, accesses the discs, communicates with your host computer, and drives your choice of serial printers.

The Model 3500's 320KB of disc has room for numerous screen formats, application programs, reports, and a day's worth of data for the host computer.

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The Perkin-Elmer ROM-resident operating system uses only 3KB of main memory. It saves you programming time with its device independent I/O, repertoire of 18 commands for controlling devices and files, command substitution system, and ROM-resident debugger. Complete disc utilities, too.

You can develop your applications right on the 3500, using our extended BASIC Interpreter and Macro Assembly language. The BASIC can call assembly language subroutines. The Editor speeds source coding, the Assembler produces object code, and the Task Generator converts it into executable program or library files.

Speeds screen generation.

The Model 3500's Screen Generator software makes developing transaction processing applications especially easy, from screen formatting right through to establishing, maintaining, and accessing

the associated disc files and interfacing with the application tasks.

More good news. The Model 3500 is packaged in three modular assemblies and measures only 19" high, 19" wide and 22 1/4" deep. Fits anywhere.

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"VAX was the only supermini to offer the address space and networking capability we needed."

*Jim Hart
Chief of Systems
Development, NASA
Ames Research Center,
Moffettfield, California*

Scientists at the NASA Ames Research Center are working in the fields of aeronautics, space science, life

science, and spacecraft technology. They use more than a dozen specialized facilities, located in the field and throughout Ames' headquarters. An extensive DECnet system allowed Ames' large central mainframes to interact easily with Digital's PDP-11s located in each lab.

But according to Jim Hart, Chief of NASA's Systems Development, "Our PDP-11 users were constantly generating new requirements for greater capacity."

That's why Ames needed more number-crunching capability at their

mainframe site. But they didn't want another mainframe.

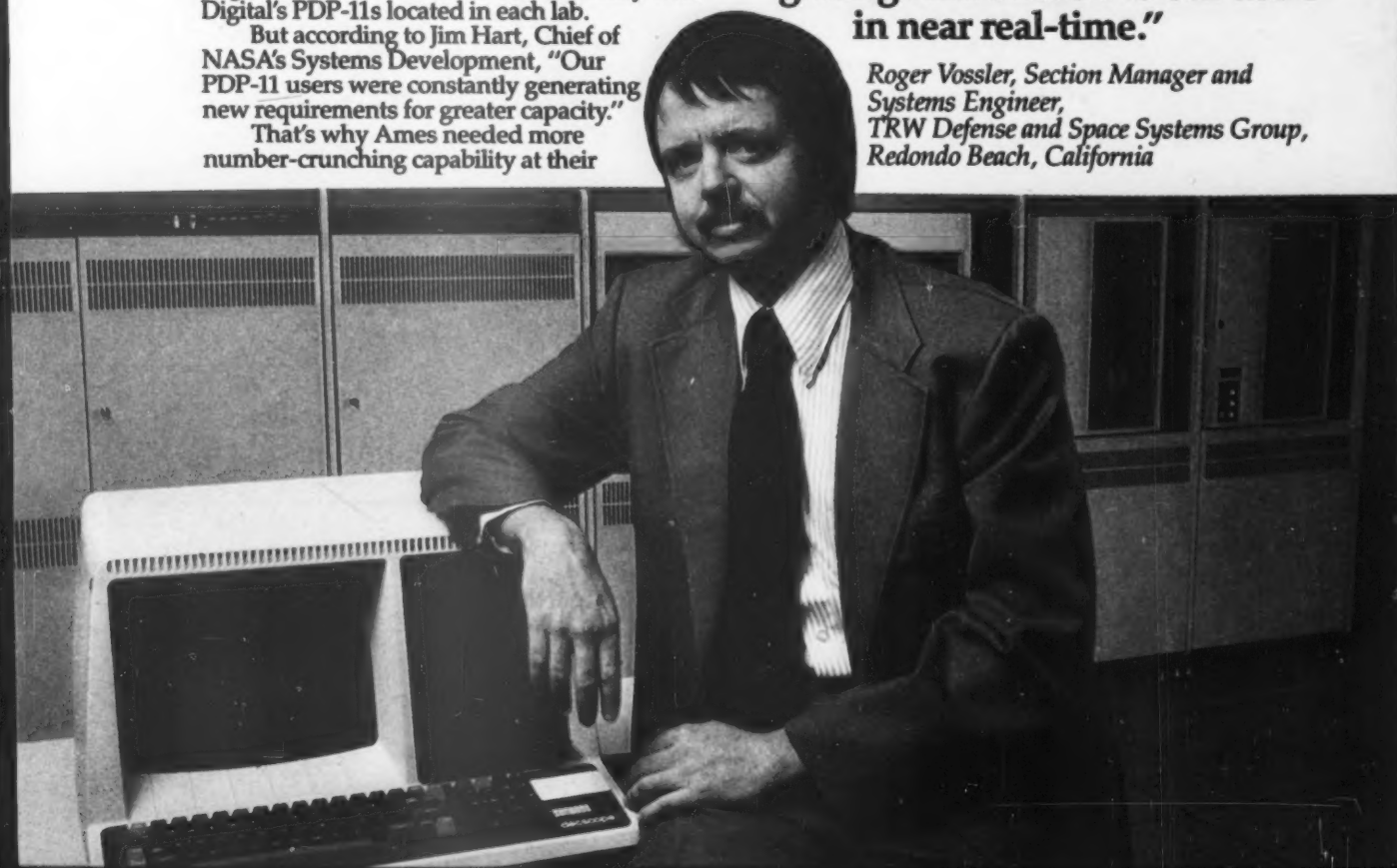
Says Hart, "A supermini like VAX was the natural choice. And because of its power and networking capacity, VAX was the only one we considered."

Now VAX works with both Ames' PDP-11s and mainframes with the help of DECnet. "For example," explains Hart, "scientists studying fluid dynamics send the huge amounts of data collected by their PDP-11s to a central Illiac IV super computer. After it's finished the heavy number-crunching, the Illiac leaves data post-processing to VAX. Final results are then transferred, via DECnet, back to the PDP-11s in the labs for either graphic plotting or interactive work."

Hart concludes, "VAX's computing and distributed data processing capabilities have helped us get the maximum use out of all our computers."

"With a distributed processing system built around VAX, we're getting information to our users in near real-time."

*Roger Vossler, Section Manager and
Systems Engineer,
TRW Defense and Space Systems Group,
Redondo Beach, California*



Sensor data processing and distributed processing systems in support of real-time embedded applications are among the specialties of TRW's Defense and Space Systems Group.

TRW uses four PDP-11 computers from Digital supporting a wide range of peripherals, all controlled by a VAX-11/780.

Roger Vossler, Section Manager and Systems Engineer, explains: "VAX's I/O bandwidth capabilities are extremely important for effectively moving large quantities of real-time data at very high rates. We're able to reduce floods of data to useful information in near real-time."

In addition to their own processing work, TRW is using the VAX-based network for general research into distributed systems. According to Vossler, "VAX provides a flexible testbed for hands-on, real-time experiments with distributed processing concepts. We're also designing and verifying higher order languages such as concurrent and distributed PASCAL."

Vossler sums up VAX this way: "It's one of the best implementations we've seen of a successful integrated hardware and software system."



**"Data transfer can take hours.
With VAX and DECnet, it
takes seconds."**

*Carl Service
Sr. Research Analyst
Lunday Thagard Oil Company
Irvine, California*

Thagard Research Corporation, a subsidiary of Lunday Thagard Oil Company, recently began using Digital's VAX-11/780 in a computer network to help with development of a new high-temperature reactor. Here's how the system works:

Data is first gathered at remote sites by several of Digital's PDP-11/03 computers. Then it's transferred through DECnet to a VAX at Thagard headquarters for data reduction, and print and graphics analysis.

Carl Service, Senior Research Analyst responsible for Thagard's data processing, admits, "When we first started out we were literally doing things by hand. Data from remote sites was recorded onto a cartridge which was hand-carried to our computers here at Irvine. It took 2½ hours just to get the data from the cartridge into the computer."

VAX's distributed data processing capabilities have saved Thagard a lot of time. Says Service, "With DECnet, data from other sites is transferred to VAX almost instantaneously."

Both Service and his users have been able to increase their productivity with their new distributed system. "It gives us immediate turnaround," he explains. "Now we can return completely reduced data to our customers while the experiment's still fresh in their minds."

Service is also impressed with the compatibility of Digital's computers: "The command languages of all Digital's operating systems are very similar. So someone who has worked with one of Digital's computers is already familiar with the others. That brings our training curve down and our production up."

Digital's VAX-11/780 sets new standards for power and flexibility in distributed data systems. With its true 32-bit address space, VAX can process data at speeds approaching those of mainframes costing far more. And with its communications capabilities, it can be easily integrated into your present computer network.

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Using Totally Redundant Systems Service Bureau Network Enjoys 99% Uptime

DES MOINES, Iowa — S&L Computer Trust here — the largest service bureau of its kind in the U.S., according to John Hanson, the cooperative's president — has experienced "better than a 99% uptime ratio over a given 12-month period" with what is reportedly one of the largest Burroughs Corp.—equipped on-line networks in the world.

Hanson attributed the cooperative's high uptime percentage to the backup capabilities provided by totally redundant systems, the company's uninterruptible power supply system from Exide, Inc. and to the fact that "we get along extremely well with Burroughs in the maintenance area."

The savings and loan service bureau organization was formed in 1978 when the Federal Home Loan Bank of Des Moines divested itself of its DP service bureau department. It handles in excess of three million savings, certificate of deposit and loan accounts for its approximately 230 member associations in Iowa, North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Missouri and Arkansas.

The cooperative had one dual-processor Burroughs B4800 and one B4700 system in 1978. The B4700 was replaced with a second dual B4800 the following year.

The configuration includes 4.5 billion bytes of peripheral disk storage

accessed by a network of approximately 1,350 Burroughs TC 700, TU 1800 and TD 800 terminals and some 300 Series 2200 and 5000 CRTs from Datapoint Corp.

Association members select and purchase terminals from a list of S&L Computer Trust approved equipment, and the response time on terminals across the network is between 3.5 and 4.5 seconds, Hanson noted.

Processing Split

Both B4800s run 24 hours a day every day of the week, with processing split almost evenly between the two configurations. Multiline controls are utilized for data communications and

the systems have processed as many as 40,000 transactions per hour and 300,000 transactions per day during peak work periods.

Future plans at S&L involve training of the 25-person DP staff in structured design and programming techniques. The cooperative has contracted with Yourdon, Inc. for the training effort, which began with a nine-month pilot study in May with "a main objective ... to determine the feasibility, practicality and financial benefits [of structured methodology]," Hanson said.

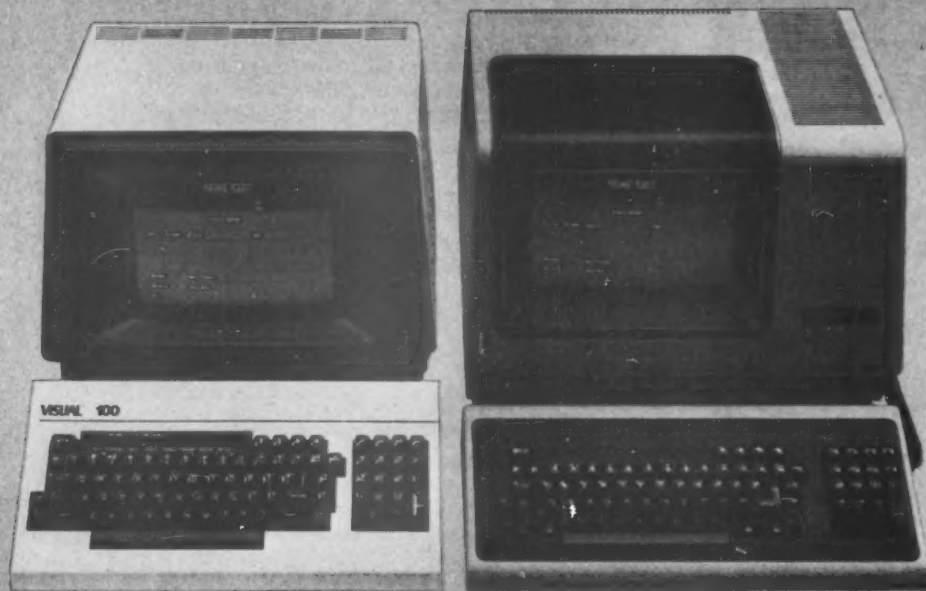
Graphics Group Plans Meeting

ARLINGTON, Va. — The first annual National Computer Graphics Association (NCGA), Inc. conference will be held at the Sheraton National Hotel here June 16-19.

The keynote speaker will be Vincent Barraba, director of the Bureau of the Census, and Curtis Fritz from the U.S. Department of Commerce, Office of Federal Statistical Policy and Standards, will run a half-day session on the Domestic Information Display System.

The conference is open to NCGA members only, and registration fees and information can be obtained from the NCGA at Suite 512, 1129 20th St., N.W., Washington, D.C. 20036

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Bits & Pieces

Units Give Prints Of Color Graphics

WESTLAKE VILLAGE, Calif. — Two systems that generate hard-copy full-color reproductions of computer graphics have been introduced by Image Resource Corp.

Both the Videoprint 3000 and 5000 series produce 4-in. by 5-in. hard-copy prints with color, brightness and exposure adjustments under microprocessor control. Polaroid SX-70 and 35mm sizes are also available, and optional controls for unattended operation are offered with the 5000 series.

The 3000 series price range goes from \$2,990 to \$3,550, and the 5000 costs \$5,950 from Image Resource Corp., 2260 Townsgate Road, Westlake Village, Calif. 91361.

Compuscan OCR Interface Fits DEC, Lexitron Word Processors
TETERBORO, N.J. — An on-line optical character recognition (OCR) interface designed for Digital Equipment Corp. and Lexitron Corp. word processors (WP) was announced here by Compuscan, Inc.

The interface provides compatibility between the company's line of Alpha-word OCR page readers and the following WP devices: DEC models WS-78, WS-82, WS-102 and WS-200; Lexitron models 942, 920/921/922, 941/945/, 1303 and 1202.

Available immediately, the interface sells for \$3,000 from Compuscan, Inc., 900 Huyler St., Teterboro, N.J. 07608.

Supersystems' Design, Coding Problems Cited

By Rita Shoor

CW Staff

ANAHEIM, Calif. — The problems involved in designing computer architecture for certain applications in science and technology where "enormous computational power" is required to provide reasonable solutions was the subject of a session entitled "Supersystems, '80s: Problems of Designing and Programming."

These problems, according to Svetlana Kartashev from the University of Nebraska at Lincoln, affect both real-time and non-real-time systems. An example of a non-real-time application would be the aerodynamic simulation of airflow on aircraft design, where enormous amounts of data must be processed, but there are no time constraints.

Additional complexities are found in real-time systems such as one required to calculate ballistic missile defense algorithms, where thousands of concurrent data streams must be processed in a short period of time.

A modular approach to solving these problems is not feasible, Kartashev maintained, because "as the complexity of a system goes up, its reliability goes down — so you can't utilize lots of modules." In addition, the extensive number of interconnections required among large numbers of modules would have a negative impact on the response time of the system.

The first paper presented in the session, "An Operating System Kernel Mechanism for the Poly-Processor System PPS-R," addressed the problems that conventional functionally centralized systems have in regard to cost/performance ratio, system software productivity and expandability for changing the system size and service in time-sharing systems (TSS).

Makoto Amamiya, representing the Musashino Electrical Communications Laboratory in Tokyo, stressed the need for functionally decentralized systems in order that the issue of concurrency in supersystems not be compromised.

He maintained that it is essential to "decompose" TSS operating system functions and to execute each operating system function simultaneously in order to solve the problems posed by centralization for supersystems.

In the presentation of "Architectures for Supersystems of the '80s," Steven Kartashev and Svetlana Kartashev maintained that the traditional sources of augmenting system throughput were not applicable to supersystems. Among these methods were faster hardware; modular expansion of the system with new equipment; equipping the system with a dedicated architecture for a given class of applications; utilization of the maximal concurrency present in programs; application of special computations (pipeline,

array or associative); and optimization in data exchanges between separate computers.

Most of these sources have an essential drawback, according to the authors. Their use leads either to excessive complexity of the hardware resources of the supersystem or to a limit in its applicability.

New sources of augmenting system throughput put forth were the adaptation of hardware resources on instruction and data parallelism utilizing dynamic architecture and the reconfiguration of hardware resources into different types of architecture. By these means, the supersystem is capable of switching its resources to behave as an array, pipeline, multiprocessor or multicomputer, as required by the

application's computations.

A third alternative was offered in "The Highly Parallel Supercomputers: Definitions, Applications and Predictions," by Hubert H. Love Jr., of Hughes Aircraft Co.

Love presented an overview of the very large, highly parallel reconfigurable array processors in which the processing task is distributed among a large number of identical processors. With proper algorithms and hardware implementation, Love maintained, these computers can achieve massive throughput rates in applications such as radar signal processing, short-term weather prediction, complex query and response systems and high-speed text processing.

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Check out our Chicago conference schedule:

June 10th Conference (Exhibit hours: 10:00-5:00)

D-1 8:45-10:00 EXECUTIVE BRIEFING: INFORMATION SYSTEMS PLANNING Arnold E. Keller, Editorial Director of INFOSYSTEMS magazine and Richard D. Koeller, Director of System Services, International Harvester will make this special presentation.

D-2 10:00-11:00 IMPROVING MANAGERIAL PRODUCTIVITY VIA EDP SUPPORT SYSTEMS Lawrence Burden, Director of Management Information Services at NW Industries, will discuss how executive productivity can be dramatically improved.

O-1 11:30-12:30 PRODUCTIVITY IMPROVEMENT IN AN OFFICE/WORD PROCESSING ENVIRONMENT Bonnie M. Polski, Manager of Medicare Systems at Blue Cross Assoc., and Pres. of Technistone, Inc. Management Consulting Firm, will discuss how to handle information distribution.

O-2 11:30-12:30 HOW TO CUT COMMUNICATIONS COSTS Frank K. Griesinger, President of Frank K. Griesinger Associates in Cleveland, will speak.

F-1 1:30-2:30 SPECIAL PRESENTATION OF MICRO-GRAPHICS APPLICATIONS Stuart Soll, Zenith Radio Corp., and Janet L. Johnson, Chicago Title & Trust Co. are panelists.

D-3 3:30-4:30 COMPUTER GRAPHICS: NEW WAYS TO VISUALIZE COMPUTER INFORMATION FOR BUSINESS, ENGINEERING AND RESEARCH USERS

M-2 3:30-4:30 OPTIMIZE MANUFACTURING PRODUCTIVITY VIA SMALL AND LARGE COMPUTER APPLICATIONS Raul E. Alavardo, Manager of Administrative Services at Arthur Anderson & Co., will discuss management opportunities and responsibilities for improving profit, cost and investment performance.

June 11th Conference (Exhibit hours: 10:00-7:30)

O-3 8:45-9:45 COMBINED WORD AND DATA PROCESSING

D-4 10:00-11:00 DATA BASE OPPORTUNITIES IN CENTRALIZED AND DISTRIBUTED SYSTEMS Neil Maupin, Systems Manager, Allis-Chambers Corp., will cover key issues.

D-5 11:30-12:30 DISTRIBUTED PROCESSING: USER UPDATE ON THIRD GENERATION EXPERIENCES Steve A. Holland, Executive Vice President of AID, Inc., will chair a panel to include James Brownell, Systems Project Manager at Allstate Insurance Company.

D-6 1:30-2:30 FINANCIAL PLANNING TECHNIQUES USING EDP TOOLS Barry Frankel of Applied Data Research will show how software applications packages and data base tools are helping financial planners make cash resources more productive.

D-7 3:30-4:30 SMALL AND DESKTOP COMPUTERS FOR PROFESSIONAL AND BUSINESS APPLICATIONS Maryann Kelley, Manager of Digital Equipment's Computer Store, will tell how personal/desktop computers can solve managerial and technical problems.

O-4 3:30-4:30 LINKING WORD PROCESSING AND PHOTOTYPESETTING TO CUT REPROGRAPHICS COST Louise Owczarski, President of Graphic Image Corporation, will give an overview.

June 12th Conference (Exhibit hours: 10:00-5:00)

O-8 8:45-9:45 ENHANCING SOFTWARE APPLICATION PRODUCTIVITY FOR END USERS Alex Gaydasch, Lead Consultant at SEI Computer Services, will discuss how users are addressing the productivity problem and potential solutions.

O-5 10:00-11:00 HOW TO USE COMPUTERIZED TELEPHONE SYSTEMS James R. Schneider, Chairman of Benton Schneider & Associates, Inc., will discuss what a data communications manager should know about voice communications, controlling costs and improving service.

S-1 10:30-11:30 DISTRIBUTED PROCESSING APPLICATIONS IN DISTRIBUTION-ORIENTED BUSINESS Anne Smyth, Mid-West Regional Manager of Distribution Management Systems, will discuss the use of EDP for controlling inventory, order entry and shipping in manufacturing, consumer goods and retail distribution.

D-9 11:30-12:30 SELECTING A SMALL BUSINESS COMPUTER: HARDWARE & SOFTWARE Lawrence Feidelman, President of Management Information Corporation and editor of *Small Business Computer News* and *Packaged Software Reports*, will make this presentation.

O-6 11:30-12:30 INTEGRATED INFORMATION SYSTEMS Thomas A. Hannagan, President of Thomas A. Hannagan & Associates, Inc., will describe how integrated information systems for "offices of the future" can improve executive and professional productivity.

F-1 1:30-2:30 STRATEGIC PLANNING FOR DISTRIBUTED PROCESSING Carl Steiner, Director of Information Systems Planning at American Hospital Supply, and Michael Heschel, Director of Information Systems Policies and Standards at A.H.S. will make this presentation.

There's more after Chicago.

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Variable Resource Architecture

BTI 32-Bit Mini Rivals IBM 370/135

By Tim Scannell

CW Staff

ANAHEIM, Calif. — Although a large number of minicomputer vendors used the National Computer Conference here recently to display their hardware products for the first time, very few of the more than 400 exhibitors took advantage of the event to announce new systems or peripherals.

One product that did promote a tremor of excitement among the badge- and button-covered masses was a 32-bit minicomputer system unveiled by BTI Computer Systems. At an early morning press conference held off the NCC campus in a nearby hotel, BTI introduced a modularized supermini that is said to have the "raw processing power" of an IBM 370/135.

What's more, when the BTI 8000 is configured in a six-processor arrangement, the

system becomes one-and-a-half times more powerful than a 370/148, Shirley Henry, BTI's manager of marketing support, said.

The 8000 can support up to 200 terminal users and features the Variable Resource Architecture (VRA) design, a flexible mix of hardware modules controlled by a self-regulating operating system.

Communications between these hardware sections is accomplished over an expanded 60M byte/sec bandwidth bus. The passive, totally hardware bus is said to be similar to, but greater than, Digital Equipment Corp.'s 5M byte/sec Unibus and Tandem Computer Inc.'s 13.3M byte/sec bus structure.

Four Modules

The 32-bit 8000 has four hardware modules: the CPU, which is identified as a computational rather than a central processing

unit since the system does not depend on any one machine to coordinate systemwide I/O activities; the Peripheral Processing Unit (PPU), which relieves the CPU of channel management duties and also provides buffering, blocking and deblocking services; the Memory Control Unit (MCU), which can juggle from 128K to 1M bytes of memory and up to 8M bytes when linked in parallel with other units; and the System Services Unit (SSU), a one-button bootstrap device that provides automatic system generation and a variety of diagnostic routines.

Under control of the SSU, each module in the 8000 is checked out as the user initiates the system. If a module board is defective, the user is signaled and a new board can be plugged in, Henry said.

Medium-Scale User

Aimed at the medium-scale commercial end user, the 8000 is Cobol-oriented and can support 32-bit Fortran, extended Basic and Pascal. In addition, users of BTI's 16-bit 5000 system can run their Basic programs on the 8000 after passing them through a one-time "filtering program" offered by the company, the marketing manager stated.

Possible 8000 configurations consist of anywhere from one to eight processors, up to 8M bytes of memory accessed by up to eight data paths, and up to 32 spindles of disks with 67M to 254M bytes of storage per spindle.

Although the company is shooting for a 90-day delivery time, the user should more realistically expect an eight-month wait for system installation. A one-processor system costs about \$107,000 and ranges up to \$500,000 in its largest mainframe-peripheral configuration. After buying the first processor, additional processors are priced at about \$16,000 apiece.

BTI is located at 870 W. Maude Ave., Sunnyvale, Calif. 94086.

MCS' First Non-OEM System Targets Small Business User

By Tim Scannell

CW Staff

ANAHEIM, Calif. — Using the recent National Computer Conference as a springboard, Mini-Computer Systems, Inc. (MCS) announced its first non-OEM computer system, aimed at the small business user.

The Micos 45 is an entry-level computer that has 64K bytes of memory, a 1,920-char. CRT and 10M bytes of on-line storage. It uses the firm's Micos operating system.

Options include a second CRT, Mtam 2780 synchronous communications and 150 char./sec to 300 line/min printers.

The system has a multislot chassis with a real-time clock and master I/O port. The computer also utilizes an extensive Basic high-level programming language and has

full software integrity and transportability up to the firm's high-end 300 computer system.

As part of the Micos 45 introduction, the company also unveiled a scaled-down version of the firm's Micaps series of applications packages. Mini-Micaps includes order processing, invoicing, inventory control, accounts receivable, accounts payable, payroll and general ledger. The packages are fully documented, with training available.

The computer system is targeted at businesses in the \$100,000 to \$1 million range and costs \$16,990. Delivery is scheduled for sometime in September or October, a spokesman said.

MCS is located at 399 Fairview Park Drive, Elmsford, N.Y. 10523.

Turnkey Fits WP, Business Use

NEEDHAM, Mass. — Information Technology, Inc. (ITI) has unwrapped a turnkey business and word processing system designed for small-scale business operations.

The Superstar system consists of ITI's Su-



The Superstar

perbrain microcomputer-based hardware package, a NEC Information Systems, Inc. Spinwriter printer and Micropro International Corp.'s Wordstar word processing software. Features of the system include two double-density minifloppy disk drives, 64K bytes of user-programmable random-access memory and such command utilities as word wrapping and dynamic pagination, a spokesman stated.

The word processing-oriented system costs \$7,500, while the business software is separately priced at \$2,500. Further information on the system can be obtained from ITI at 56 Kearney Road, Needham, Mass. 02194.

Mini Conducts Accounting For Boston Symphony Orchestra

Special to CW

BOSTON — Although you won't find it in the string or percussion sections or listed in any concert programs, a minicomputer plays a major role in the day-to-day operations of the Boston Symphony Orchestra (BSO).

The BSO is actually a compilation of many small businesses, which range from selling T-shirts to producing recordings. In fact, these businesses allow the organization to generate funds to meet more than 70% of its annual expenses, the highest rate of self-sufficiency of any symphony orchestra in the world.

It was, therefore, quite sensible for the BSO to take its first step into the computer age by automating its accounting procedures. The orchestra currently has a Wang Laboratories, Inc. 2200VP computer system, which includes a 2260B fixed-/removable disk drive with 10M bytes of storage and a Wang 2221W 200 char./sec printer. So far, the system's performance has drawn rave reviews, according to Walter Hill, manager of the BSO's business affairs.

Back in 1977, Hill started looking into the possibility of acquiring a computer to organize and speed up the orchestra's general accounting functions. Although Hill came to the BSO with a DP background, he could neither write complex software programs nor afford to hire someone who could.

The BSO's business manager did research

on IBM, Basic/Four Corp., Wang and a number of service bureaus. He finally selected a Wang 2200T CPU because of its hardware and the availability of the proper software. The machine was later upgraded to the 2200VP.

Rollins Systems, a software house based in Salem, N.H., and affiliated with Wang, designed the BSO's general accounting package according to some previous systems analysis work provided by Hill. Currently, the software handles such functions as general ledger, budgeting, accounts payable, accounts receivable and payroll.

Elaborate Organization

"It is a weird and wonderful payroll we have here," Hill commented, noting that it involves everyone in the BSO from director and Conductor Seiji Ozawa to the Symphony Hall janitor. While the organization has annual salaries that it pays biweekly, it also has a piece-work system for the orchestra and an elaborate scale for compensating musicians for playing more than one instrument, playing solo, providing extra services or working overtime.

In addition, during the summer, the BSO staffs and maintains Tanglewood, a 210-acre country estate and 5,000-seat concert shell in Massachusetts' Berkshire Hills. With its extra symphony orchestra and af-

(Continued on Page 66)

MINIWORKS

Mid-Scale Mini Has Winchester, Tape Units

By Tim Scannell
CW Staff

ANAHEIM, Calif. — At the National Computer Conference here last month, Harris Corp.'s Computer Systems Division demonstrated for the first time a medium-scale minicomputer system that incorporates both a Winchester

disk and a horizontal-loading streaming magnetic tape subsystem.

Described as a natural extension of the firm's Model 100, 200 and high-end, 48-bit Model 500 systems, the Harris 80 features up to 768K bytes of real memory and more than 6M bytes of virtual memory

space. The 24-bit computer is the company's first packaged system and supports up to 32 interactive terminal users. In performance, the 80 is said to be comparable to Digital Equipment Corp.'s PDP-11/70 machines.

The system is aimed at scientific multiprocessing environments and was designed around a central system bus capable of transferring data at rates up to 19 byte/sec, a spokesman said.

The Harris Winchester disk subsystem can handle up to 80M bytes of data and has a universal disk controller (UDC). The UDC reportedly protects the user from inad-

vertently reading or writing data by defining header and password records for each disk sector.

Eight Disk Drives

The UDC can support a total of eight Harris disk drives in a variety of storage configurations, the spokesman explained.

The system's magnetic tape unit accepts horizontally loaded tapes up to 10.5 inches. The unit operates at 25 in./sec in a 1,600 bit/in. density phase-encoded format and does not employ any vacuum columns for tape buffering. Up to four tape drives can be used with the unit's single

controller, the spokesman added.

The system operates under the Harris Vulcan Operating system and can use a variety of Harris commercial and business software packages.

Targeted for systems houses, but also available to the end user, the Harris 80 with 192K bytes of memory, disk drive, tape drive and CRT costs \$74,950. The price includes the operating system software.

First deliveries are scheduled for sometime near the end of this year from the company's Computer Systems Division at 2101 Cypress Creek Road, Fort Lauderdale, Fla. 33309.

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Xylogics Adds 8-In. Disk System

BURLINGTON, Mass. — Xylogics, Inc. has introduced a modular, rack-mountable 8-in. Winchester disk subsystem that is compatible with Digital Equipment Corp. minicomputers.

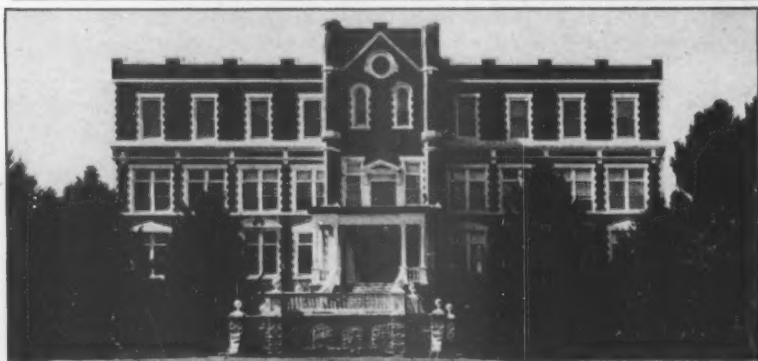
The Xylos system features single-card microprogrammed peripheral processors designed to transparently emulate DEC's I/O handling protocols. The system's modularity is said to allow the user to combine a choice of disks up to 40M bytes. The disk package includes an LSI-11 microcomputer and can optionally

be fitted with a tape cartridge drive for backup.

Xylos will initially be offered in three prepackaged configurations: the Xylos-1, with a 24M-byte Winchester drive; the Xylos-2 with two drives; and the Xylos-3, with the two drives and a 17M-byte cartridge tape drive for backup and program loading, a spokesman said.

Finally, the Xylos disk system reportedly includes a rugged chassis that can accommodate three basic peripheral configurations and has room for expanding the LSI-11 to include up to 256M bytes of memory.

Prices for the drives begin at \$6,250 each from Xylogics at 42 Third Ave., Burlington, Mass. 01803.



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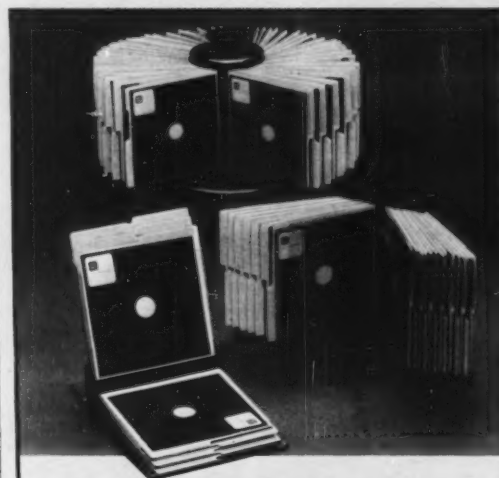
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Diskette Filing Systems by



Choice of 300- to 1,800 Line/Min Add-On Printing System Fits HP 3000 Minis

MENLO PARK, Calif. — An add-on printing system from BDS Computer Corp. is said to give users of Hewlett-Packard Co. HP 3000 Series I, II and III minicomputers the choice of 300 line/min to 1,800 line/min printers at costs 30% to 50% less than OEM printers.

The heart of the system is BDS's controller, the HPC30, which is functionally compatible with HP's controller and transparent to the HP 3000's operating system. The controller operates under programmed I/O or with direct

memory access, the firm said. The complete system consists of the controller and one of seven line printers offered by BDS that employs either band or drum technology. The HPC30 system employs standard peripheral address numbers and interrupt priorities. It reportedly receives data and commands directly from the HP 3000 I/O peripheral bus

while print operations are controlled either from the CPU or from the multiplex-channel bus. Transmission to the printer is via a parallel bus with a maximum 1,800 line/min printing rate.

The HPC30 also has on-board diagnostic circuits and LED status indicators to aid troubleshooting and maintenance, a spokesman for the

firm said.

Up to seven line printers can be interfaced with the HPC30, requiring only jumper installation and switch settings on the board. The printers, supplied by BDS, have either a 132- or a 136-column line length and use the standard 64-character ASCII set with 96 characters. The BDS band printers have speeds of 300-

and 600 line/min; the drum printers operate at 300-, 600-, 900- and 1,800 line/min; and Charaband printer runs at 1,250 line/min.

In single quantities, the BDS printing systems range in price from \$8,000 to \$31,000, depending on the printer selected, the spokesman stated from 1120 Crane St., Menlo Park, Calif. 94025.

Point 4 Adds Controllers

IRVINE, Calif. — Point 4 Data Corp. has unveiled two disk controllers that are compatible with the firm's Iris real-time operating system and were designed to fit the Point 4 and similar minicomputer systems.

The first controller, the Lotus 700, is an SMD/CMD-compatible moving-head disk storage interface that utilizes a single-board design and incorporates low power Shottky and MSI logic.

The unit can interface up to four disk storage modules at transfer rates up to 1.209M byte/sec. The 700 will support any mixture of Control Data Corp. 9448, 9730 and 9760, Ampex Corp., Century Data Corp., Okidata Corp. and Fujitsu, Ltd. drives.

The Lotus 701 provides advanced 10M-byte interface capabilities and utilizes only one card slot in the minicomputer mainframe. The controller can handle up to four 10M-byte drives and will accommodate either multisurface single-platter, cartridge-type or multiplatter disk drives.

Periodic training courses for both the Lotus 700 and 701 controllers are offered by Point 4 Data, and a full-time customer support staff is available. The 700 costs \$3,390, while the 701 sells for \$1,450, with OEM discounts available from the firm at 2659 McCabe Way, Irvine, Calif. 92714.

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offers horizontal data base portability across 18 different minicomputers and operating systems, while providing vertical compatibility to Series 80 TOTAL in the mainframe environment. This flexibility enables you to (1) develop applications centrally and distribute them to users with different target minicomputers, and (2) lay a solid foundation for distributed data base.

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Power Line Disturbance Analyzer Cuts Mishaps

Special to CW

Computer malfunctions and downtime should not always be blamed on the computer, since even the best machines cannot function reliably in a disrupted environment.

Shutdowns that interrupt production schedules, create customer relation problems and otherwise alter or damage the output of a DP operation are frequently the result of power line disturbances external to the computer. However, isolating power line disturbances that cause system malfunctions is difficult because the malfunctions normally do not follow any logical pattern.

At NCR Corp., the electrical power applied to its installed computer systems and point-of-sale terminals is

analyzed before a computer is deemed ready to run. NCR personnel not only determine the adequacy of a user's power source, but determine the probable causes of, and remedies for, power line mishaps.

Power Monitor

The minicomputer manufacturer uses a Dranetz Engineering Laboratories Inc. Model 606 power line disturbance analyzer to monitor the computer's power source. The instrument has individual detectors that monitor the ac inputs for deviations that represent sags, surges, slow average variations and impulses. The detector outputs are then scanned, digitized and input to a microprocessor, a spokesman explained.

If a power disturbance exists, the microprocessor analyzes its parameters and then logs the time of day, channel designation, type and amplitude of the disturbance and the duration.

To avoid data loss, the analyzer stores all power information on up to 15 disturbances that may occur during a printout. After that number, the analyzer continues to accumulate data in

summarized form. When the printer is free, the analyzer prints the 15 disturbances in sequence.

Once connected to a power line, the analyzer can function indefinitely, within the limits of its paper supply, unattended and without interruption, the spokesman noted. Dranetz Engineering Laboratories is located in South Plainfield, N.J. 07080.

Datasystems Controller Runs on IBM Series/1 Mini

SAN DIEGO — A line printer controller for IBM Series/1 minicomputers has been unveiled by Datasystems

Corp.

The DLP-3300 controller emulates IBM's 4973 unit and operates in any single slot of the Series/1 or the 4959 I/O expansion system. The controller is compatible with IBM's RPS, EDX and CPS operating systems.

Like other controllers introduced by Datasystems, the DLP-3300 features self-test and switch-selectable addressing to any of the 128 address locations supported by IBM software and can handle any printer using either a Centronics Data Computer Corp. or Data-products Corp. interface standard, a spokesman said.

The unit was designed with Bipolar/MSI and LSI logic. It has a data transfer rate of 1.6M byte/sec and a cycle time of 170 nsec.

An external long-lines unit is available for the controller for printer placement up to 3,000 ft from the host minicomputer. The DLP-3300 costs \$1,950 from the firm at 8716 Production Ave., San Diego, Calif. 92121.

Mini Conducts Accounting

(Continued from Page 63)

filial music school, Tanglewood provides further complications.

"Before computerization," Hill added, "a semblance of order would be achieved only after the close of the fiscal year," when it was too late to do us any good.

One of the unique features of the system is its human engineering, the business manager continued. Rollins Systems personnel demonstrated all the functions of the accounting package only three times and then the BSO staff was able to put the computer through its paces on their own.

Future Upgrades

With increasing concert schedules and tighter musical responsibilities, the BSO is presently looking forward to future equipment upgrades. In particular the orchestra's DP staff wants to look into text-editing software that would make corresponding with contributors and trustees less of a time-consuming task.

Hill also sees upgrading to an MVP environment. But the present VP is not yet fully utilized. For this reason, Hill has taken an interest in programming tools such as the Inquiry Data Entry Access System (Ideas). With his grasp of Basic, the business manager believes he has enough technical background to use Ideas to program for whatever needs arise and even to get higher productivity from the current hardware.



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Computerworld Extra will also be different in its focus. The entire issue will be devoted to one subject: "Software Systems in the '80s," and it will contain articles by some of the world's leading authorities on the subject, including Tom Muerer, Dixon Doll, Stephen Robinson, Dan McCracken and the experts at Auerbach Publishers and Datapro Research.

Topics to be covered will include The Bright Future of Applications Software Packages; the State of Utility Software, Data Communications Software Trends in the '80s and What's Ahead in Distributed Data Processing Software. Special emphasis will be given to one of the hottest areas of computer software — data base management systems.



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Industry Growth Seen Outpacing GNP

By John Whitmarsh
CW Staff

ANAHEIM, Calif. — The DP industry will grow twice as fast as the GNP for the rest of this decade, with real-dollar expenditures doubling from \$54 billion this year to \$109 billion in 1990.

That rosy picture of the DP industry was painted for attendees at a National Computer Conference seminar here by Paul Rosenthal of Gottfried Consultants, Inc. of Los Angeles.

Rosenthal's prediction was not a restatement of previous forecasts nor was it pulled out of a hat. Rather it was derived from a cross-impact simulation model developed at the University of Southern California's Center of Future Research.

Cross-impact analysis is a state-of-the-art modeling technique that simultaneously pulls together three elements in one model to draw inferences about future events: ongoing trends (certainties), future events (uncertainties) and management reactions to probabilities of events in the future.

Microeconomic Application

Cross-impact analysis is currently used in half a dozen large corporations, including General Motors Corp. While generally applied to macroeconomic issues with time horizons of 10 to 20 years or more, Rosenthal's use of the model to predict the future of data processing is the first microeconomic application to simulate the evolution of an emerging industry.

"The purpose of the exercise was not so much to produce a valid forecast as to prove that the methodology works in a microeconomic situation," Rosenthal explained.

"Mine was a naive model, but the results compare favorably to previous forecasts which means this simulation has significance. This is not just another forecast, but a long-range planner's tool."

The model also predicted these additional trends in DP during this decade:

- An "explosion" during the early 1980s of decentralized minicomputer-based systems and network information services (NIS).

- Network information services will account for approximately two-thirds of the total growth, while expanding decentralized systems will account for the remaining third.

- The late '80s will see a continuation of the network explosion but will also witness a "significant slowing" in the growth of decentralized systems.

- Centralized large-scale systems, the oldest and largest segment of the industry, will show no sales growth during the decade.

Unexpected Results

Rosenthal said that the forecasts contained no surprises, but they did generate some unexpected results.

(Continued on Page 73)

DASD to Stress Variety In Hardware Offerings

MILWAUKEE — DASD Corp. here, a six-year-old contract programming outfit, entered the turnkey systems business last week, thus joining the precious few software and service vendors who have embarked upon hardware sales.

"We are taking a variety-store approach," according to Thomas Patti, vice-president of market development, who explained the firm would offer a variety of hardware and software to a variety of users.

Building on its contract programming expertise — some 400 DP professionals in 26 locations nationwide — Patti thinks DASD will be able to offer users solutions to nearly any DP problem.

DASD expects to cover the waterfront with its hardware offerings and is now negotiating contracts with three vendors.

Although Patti was unable to disclose the names of these vendors at press time, the firm is close to signing contracts with a major distributed processing firm; a vendor offering program-

compatible IBM 370/138 and 148 processors; and a major mainframer for its minicomputer line.

To market its new line of products, DASD has set up a Business Systems Division, initially staffed with three sales people. This sales organization is housed in Philadelphia and corporate headquarters here.

Besides the direct sales force, DASD will rely on its 50-person contract programming sales force for leads as well as on its sizable number of contract programmers.

In addition, the firm, which has revenues of about \$18 million, will launch a national advertising program for its new product offerings.

Users Targeted

DASD is targeting its systems to three user categories, including first-time users. The firm will also court the medium-size users who want to diversify and expand their host systems by add-

(Continued on Page 72)

Group to Study '34 Act Rewrite

By Phil Hirsch

CW Washington Bureau
ANAHEIM, Calif. — An industrywide group was formed here recently at the National Computer Conference to study and respond to recently proposed changes in the "Communications Act rewrite" legislation now pending in Congress.

About 20 companies have joined the study group so far, said Harold O'Kelley, chief executive officer and president of Datapoint Corp., who originated the idea. He declined to identify the other participants.

Formation of the group was announced at a press conference which followed a private meeting attended by 30 vendors. They included Harris Corp., Informatics, Inc., Hewlett-Packard Co., Uni-

vac and IBM.

"It is apparent that legislation permitting the AT&T monopoly to participate in the data processing market will have a significant negative impact on our industry," O'Kelley said. "The question . . . is whether the free, competitive market will be allowed to survive."

Immediate Goal

The immediate goal of the study group is to persuade Congress to hold further public hearings on legislation now under consideration in the House of Representatives and Senate communications subcommittees that would supplant the Communications Act of 1934. Three bills have been introduced: S. 611 and S. 622 in the Senate and H.R.

6121 in the House [CW, May 26].

The need for hearings is prompted by "our continuing efforts to keep track of the 11th-hour changes in the legislation and our attempts to interpret what these changes . . . would mean to our company and industry," O'Kelley explained.

"No public hearings on the currently proposed bills have been held this year, and . . . without [them] those who stand to be most directly affected will be denied the opportunity to register their concerns or to make suggestions."

The study group will "define areas of concern in the broadest sense and then allow representatives from various sectors of the

(Continued on Page 74)

By Gilbert W. Harrison

Special to CW

Mergers and acquisitions have become an important fact of life in the computer industry, for both private and publicly held companies.

In 1978 the total value of reported mergers and acquisitions was \$34.2 billion, the highest in 10 years. There were more than 1,600 consolidations during the first nine months of 1979.

Unlike the past, today's merger activity stems almost as much from sellers as buyers. Either by choice or necessity, many companies — particularly those with sales of \$5 million to \$50 million — are seeking to become part of a larger operation. And while little has been written about mergers from the seller's standpoint, companies contemplating such a move need to know how to find, and deal with, potential buyers. Usually, this process is more difficult than acquiring a company, and there are just as many pitfalls.

Underlying every sale of a company is the fact that an owner wants to cash in on the years of hard work spent in building the business. Today, however, probably more than any other single reason, companies are being sold because of financing needs. They need capital to grow and find it difficult to get for a number of reasons.

As a result of inflation, credit availability is limited and the cost of borrowing is reaching astronomical levels. Attitudes have become conservative at venture capital investors, insurance companies and other institutional lenders, and there is a poor market for new equity issues. Merging with a larger corporation, especially one that is cash-rich, may be the only way to solve this problem.

But there are numerous other motivations for selling a company, especially one that is closely held. Principals may be worried about the outlook for the business in the face of increasing competition.

(Continued on Page 70)

Mergers Open Pitfalls For Seller, Too

Three Makers Show Tape Streamers

ANAHEIM, Calif. — Tape streamers from three manufacturers were displayed at the National Computer Conference here recently. And, while not creating anywhere near the hoopla the 8-in. Winchester drives did last year, the streamers drew considerable attention.

Following IBM's introduction of its Model 8809 tape streamer last year, Kennedy Co. and Nippon Peripherals Ltd. introduced their units at the show. Cipher Data Products, Inc. introduced its F880 unit in 1979. All units shown were IBM- and Ansi-compatible.

In addition, three other vendors — Wangco, Inc., Pertec Computer Corp. and Control Data Corp. — reportedly have their models in the wings.

The demonstrated streamers vary in recording speed for the start and stop

mode, but all are .5-in. tape, 1,600 bit/in. models and operate at 100 in./sec in the streaming mode.

Small System Use

Although primarily designed as backups for Winchester disk drives, Cipher's F880 streamers are targeted as inexpensive alternatives to conventional tape transports, according to L.D. Hemmerich, vice-president.

Harris Corp. is using Cipher's streamer, priced at \$2,000 per unit on an OEM basis, in its new Harris 80 minicomputer, the company's first packaged system for the low-end user.

Kennedy is also negotiating to sell its streamers for use as tape units in small systems, according to Darel L. Meyer, tape product manager.

On the other hand, Nippon Peripherals is aiming its streamers, priced at \$5,000 per unit, primarily as IBM replacements. However, Nippon does offer a bare-bones OEM model for \$3,000, the firm said.

In the streaming mode, Cipher's unit can dump 46M bytes of data onto a tape in 4.8 min. Kennedy's unit can record 30M of formatted data in 2.8 sec.

While Kennedy's streamer operates at 12.5 in./sec in the start and stop mode used in conventional tape drive applications, its access time for both reading and writing data is 40 msec. This is the same as Cipher's unit, which features a 25 in./sec start and stop velocity. All microprocessor-driven units accommodate 7 in., 8.5 in. or 10.5 in. tape reels.

TI Center Aids Speech Research

DALLAS — Texas Instruments, Inc. has opened another Regional Technology Center to help customers with Solid-State Speech vocabulary development and advanced semiconductor product training, applications and design.

The center is part of a corporatewide commitment to further its speech technology and to integrate speech into its new product plans, TI said.

The technology center is located in Waltham, Mass., at 400-2 Totten Pond Road and includes a lecture classroom, a combination lab and classroom and a dedicated engineering lab. The laboratories house development systems for Solid-State Speech vocabularies, microprocessors, microcomputer board and single-chip microcomputers, wire-wrapping equipment and printed circuit design, as well as standard test instruments.

Data books, reference guides, TI Learning Center publications and self-study training materials will also be stocked at the center.

Additionally, design services on a contract basis, vocabulary development and training courses and seminars featuring different levels of technical knowledge will be offered. TI's first Regional Technology Center was opened in Chicago last August, and more are being planned.

Growth Plan

TI believes speech technology will be the next major growth area, promising a \$3 billion worldwide semiconductor industry opportunity by the end of the decade, the firm said.

The firm's support plan to meet this growth includes, in addition to the Regional Technology Centers, two new semiconductor wafer fabrication facilities, accelerated corporate research and development into speech technologies — such as recognition, authentication and data compression.

In keeping with its new thrust, TI is also offering its Solid-State Speech technology, first incorporated in its Speak & Spell, to OEMs.

Speech products to be used for customer vocabulary development will be the newly introduced TM990/306 speech board and devices in TI's new TMS5000 series of speech-processing computer chips and the TMS6000 series of compatible storage devices.

Initial offerings in the TMS5000/6000 series chip set, which provides 100 words of synthetic speech, include the TMS5100 single-chip speech synthesizer, which digitally encodes speech through pitch-excited Linear Predictive Coding, and the TMS6100 PMOS 128K-byte read-only memory.

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Merger Guidelines Offered From Seller's View

(Continued from Page 67)
Patent protection may be expiring. There may be a need for more sophisticated expertise and support in marketing, technology and other areas.

Perhaps management is reaching retirement age and has no line of succession, or it may want the satisfaction of growing within a larger entity. A majority owner can be worried about estate taxes, or just want to cash in on the operation: selling the company turns

tied-up assets into liquid assets. In a small public company, management may want to be relieved of the time, effort and expense involved in being publicly owned and just concentrate on running the business.

Another major attraction for joining forces with a larger corporation is that shareholders can become owners of stock which is more readily marketable and potentially more valuable.

Through objective methods, both the seller and the buyer can arrive at a valuation of the company. But value, of course, does not always dictate purchase price. The buyer may pay more if there is an important need for the acquisition, or an anxious seller might accept less.

In determining worth, a selling company is compared with others in its industry on such factors as return on sales, return on assets, return on equity and price: earnings ratios. Its operations are also measured in terms of capitalization of income, discounted cash flow and asset valuation.

Obviously, selling the company is one of the biggest decisions a management can make, but whether this decision can be carried out successfully is an entirely different proposition.

Public companies are more salable because they have earnings records that speak for themselves and most likely employ sophisticated planning techniques and management systems. By contrast, private companies usually try to minimize taxable earnings, which can make them less attractive to buyers.

However, there are steps a private company can take to position itself more favorably before going onto the market, such as reducing operating costs, dropping unprofitable products or installing more efficient controls.

It can also pare to reasonable levels the salaries and expense accounts of principals and their relatives, which are often inflated, as well as reduce to realistic levels the inventory "cushion" which many private companies build up. Being able to add another \$100,000 to the bottom line can mean an additional \$700,000 when a business is sold at seven times earnings.

Finding a Buyer

Leads to potential buyers can come from a variety of sources — key employees, lawyers, bankers, accountants, consultants. Some buyers make themselves known at business gatherings, particularly in merger and acquisition seminars.

Unless someone is already knocking at the door, however, sellers may well need outside expertise in presenting themselves most effectively, locating potential purchasers and negotiating the deal.

There are intermediaries available with professional backgrounds and well-established reputations, as well as some who perform only limited services. If such a specialist is used, it is a good idea to have a written contract to avoid possible misunderstandings. Brokers generally get paid a commission only if the merger or acquisition is consummated, but many require a retainer fee to cover their expenses.

There is a generally recognized 5-4-3-2-1 formula for finder's fees: 5% of the first \$1 million received from a sale, 4% of the next \$1 million and so on down to 1% of the balance above \$4 million.

However, the formula does not necessarily apply to sizable transactions and, in many cases, 1% of the consideration is used, while in others a flat fee will be arranged regardless of purchase price.

A lot has changed since the acquisition frenzy of the late 1960s, when companies were often gobbled up without

careful examination. Now mergers and acquisitions are a key factor in long-range corporate planning, and most buyers conduct an exhaustive analysis of candidates with specific criteria in mind.

In trying to present the company in the best possible light, a seller should resist any temptation to hide or "massage" information. Such efforts are likely to be discovered and cool off a prospective buyer.

Seller Guidelines

Whether a company is searching for a buyer or being pursued by one, its main object is to obtain the best price at the minimum tax cost. Its chances for success will be increased if the following guidelines are observed:

- *Investigate the buyer.* If present management is being retained in an acquisition, it is important for the seller to know whether the two companies are a good "fit."

- *Analyze the specific gains to shareholders.* Should the deal be structured as a taxable or nontaxable exchange? If payment is by securities, what is their real worth as an investment?

- *Discuss major problems early.* Putting key issues and concerns on the table at the outset prevents negotiation from bogging down later.

- *Don't nit-pick.* Small technicalities should not be hammered out in negotiation sessions, but left in the hands of lawyers and accountants.

- *Be realistic.* Buyers lose interest in sellers who drag their feet in negotiations or get overly greedy.

- *Consider outside help.* An experienced intermediary can assist in establishing the selling price and contacting potential buyers, as well as serve as an important "buffer" in conducting negotiations.

Harrison is chairman of *Financo, Inc.*, a Philadelphia-based firm specializing in mergers, acquisitions and divestitures.

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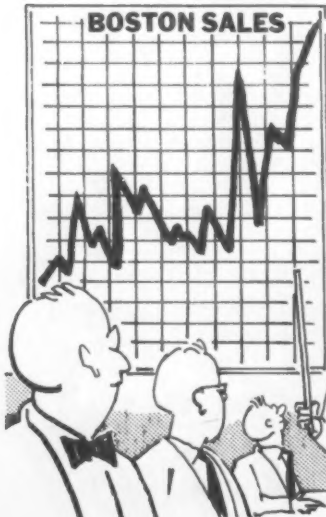
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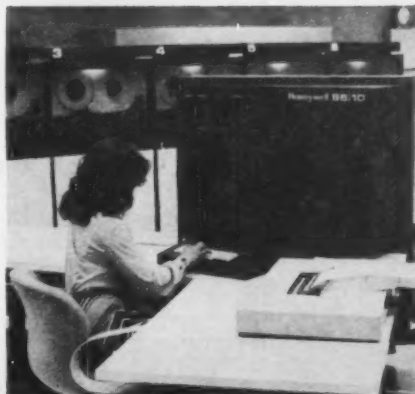
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Ireland Shaping Up as Home Of U.S. Overseas Operations

By Ivan Berenyi
Special to CW

Ireland, home for the overseas plants of more and more U.S. computer products manufacturers, is also shaping up as a significant market for those who just want to sell, according to Denis J. Behan, general manager of Cara Data Processing Ltd., whose company already represents several U.S. makers.

Cara, Ireland's largest service bureau, has a computer products division which was launched in the early 1970s and provides a countrywide service apart from acting as a local agent. The division has installed 55 Datapoint Corp. minis and terminals, ranging from the 1500 to the Narc, as well as 50 Data 100 terminals, 73 Centronics Data Computer Corp. printers, 720 Racal-Milgo, Inc. modems and 160 Lear Siegler, Inc. displays.

"The computer products division supplies, installs and maintains both hardware and software for the four manufacturers hitherto adopted," Be-

han said. "It is our dynamically growing division which started by selling Data 100s for RJE in competition to IBM and proved tremendously successful. Now it covers the lower end of the DP spectrum — but we are still interested in new products."

Legal Origin

Cara (the word means "friend" in Gaelic) counts its "legal origin" from 1966, when a Dublin bureau, ICBS, was set up by local entrepreneurs. Aer Lingus, the Irish national carrier, entered the bureau business in 1968, selling spare time on the IBM 360s it used for reservations, and bought up ICBS in 1972.

The bureau operation gradually detached itself from the airline's computer department. Now Cara is one of the 30-odd subsidiaries of Aer Lingus' Ancillaries Division, along with the Dunfey Hotels chain, which owns 21 hotels in the U.S. including the Statler Hilton in New York and the Ambassa-

DASD to Market Turnkey Systems

(Continued from Page 67)

ing products from other vendors, Patti said. Finally, DASD will aim its products at large companies with a need for enhanced distributed processing capability.

Moreover, Patti said DASD will be acquiring the rights to distribute several standard software packages.

The firm already offers a college management system and is in the process of evaluating standard business packages and a manufacturing system.

Implementation of these packages on the selected hardware is not anticipated to be problematic as "DASD's forte is translators and conversions," Patti said.

Seminar Set on Time-Sharing

NEW YORK — A one-day seminar for anyone interested in marketing time-sharing services or for in-house users who need to control the use of outside time-sharing services within an organization while meeting their own end-user needs will be offered by DTSS, Inc., a subsidiary of Metropolitan Life Insurance Co.

The featured speaker will be Dan Walkovitz, president of Corporate Management Systems, Inc., a Denver-based firm specializing in effective use of interactive computing for the solution of business problems.

The seminar will include a comparison of interactive computing with batch processing and differen-

tiation of the markets for each; and growth and profitability trends in the time-sharing industry and expectations for the future.

Entitled "Overcoming the Barriers to High-Performance, Low-Cost Interactive Computing," the seminar will be held on June 24 at the Metropolitan Life Insurance Co.'s Memorial Hall at One Madison Ave. New York. The fee is \$175 and includes the seminar itself, a lunch, a hands-on session with the DTSS time-sharing system and an information kit.

DTSS, a joint developer of the Dartmouth Time-Sharing System is headquartered at 10 Allen St., Hanover, N.H. 03755.

dor East in Chicago.

The company employs 350 staff members and aims at a revenue of \$5 million in 1980. It has four divisions: the data center and bureau (employing 60% of total staff and earning 50% of revenue); computer products (22% and 30%); consultancy (15 and 15%); and the Cara-link time-sharing bureau (3% and 5%).

Bureau Activity

The bureau side, which will shortly replace its IBM 360/65 and 50 by two 4341s and sells a remote batch accounting service, "is a gradually declining activity," according to Behan.

Cara-link was set up in April 1978 and is the most recent of the four divisions. An interactive bureau, it origi-

nally employed two Hewlett-Packard Co. minis as the hardware base, but then switched last year to two Model 4000 minis with big-capacity disks from BTI Computer Systems of California.

Currently 23 customers are linked to the 4000s via Lear Siegler screens and Centronics printers. "The BTI hardware is extremely reliable," Behan said, "and it has tremendous communications capability."

The consultancy division, which goes back to the company's birth, spawned a London branch in 1979 whose sole product for the time being is the Datahost hotel package. This was developed in the U.S. by Sigma Corp. and is based on Four Phase Systems, Inc. minis.

HOW TO COMPLEMENT

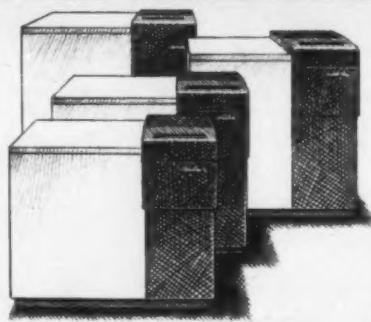
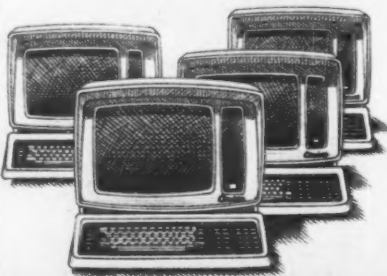


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IRD Sees Explosive Growth in Voice Data Entry

NORWALK, Conn. — This decade will see explosive growth in the voice data entry equipment market, which is expected to climb to \$1 billion by the end of the 1980s from its current average of little more than \$15 million per year, according to a recently published market research report.

Growing almost as fast will be the optical character recognition (OCR) market. OCR devices will be used increasingly in word processing and electronic mail applications, the report from International Resource Development, Inc. (IRD), a management con-

sulting and marketing research firm, predicted.

Projected to more than double in size over the next 10 years, the data entry equipment market will offer opportunities to new suppliers, particularly in the specialized terminal, OCR and voice entry segments, according to the report, titled "Data Entry Equipment in the 1980s."

Currently very strong are the point-of-sale (POS) and automatic teller machine (ATM) markets, according to the report, which predicts continued rapid growth in the banking terminal market

until around 1984, when the shipment level of ATM equipment is expected to peak. The market is expected to remain strong through 1986, however, as second-generation POS equipment replaces aging electronic cash registers.

Forms Usage

On a less optimistic note, the business forms industry should expect a "net decrease in paper usage" to result from voice entry and other paperless entry techniques, according to IRD.

Included in the report are assessments of the probable future positions

of 15 different types of data entry technology, with a discussion of the leading data entry equipment vendors and their likely future strategies. Also included is an analysis of the impact of distributed processing on the need for data entry equipment and a prediction that a growing proportion of data will be entered from general-purpose terminals or communicating word processors.

The increased reliability and reduced cost of OCR equipment will be a major impetus for growth in that area, according to IRD, which projects prices to drop as low as \$7,000 by mid-decade for high-capability OCR equipment aimed at office applications. The report reveals that newly-formed Readermatic Corp. of Mountain View, Calif., will aim squarely at this part of the OCR market. The report also views as "significant" the recent acquisition by Xerox Corp. of the OCR pioneer Kurzweil Computer Products, Inc.

The report notes a trend toward automatic data entry, either by capturing the data at its source or through voice/character recognition techniques and also predicts that the keypunch process will soon be nonexistent. Additional high growth areas mentioned in the report include hand-held data recorders, two-way terminals, sensor-based subsystems and digitizers.

The report, which costs \$985, is available from IRD at 30 High St., Norwalk, Conn. 06851.

Industry Growth Seen Outpacing GNP

(Continued from Page 67)

For starters, "the forecasts indicate that the growth of network services during the '70s through dedicated networks will, in the '80s, switch to shared network utilization via NIS-type services," Rosenthal said.

"The next decade, therefore, should see a rapid growth of value-added network carriers that offer shared data communication services, permitting electronic mail and data base access."

The forecast also unexpectedly showed a slowdown in the erosion of centralized DP services.

"The '70s were a decade of rapid transfer of centralized batch applications to decentralized and network services. This erosion will slow, and centralized services will grow slightly during the '80s as expected improvements

in large-scale computer productivity make integrated management information systems practical for most firms," Rosenthal said.

Also unexpected, minicomputer-based decentralized services growth will slow to the industry average by the mid-1980s.

"This indicates that increasingly the minicomputer vendors must, within the next several years, look to network-oriented products as opposed to computational products if they wish to maintain their rapid growth," Rosenthal cautioned.

Impact on Management

What do these predictions mean for management?

"The primary impact of the continued expansion of decentralized infor-

mation systems over the next five years will be the ability of small and satellite organizations to automate such day-to-day applications as order entry, inventory control, billing and office automation," Rosenthal said.

The productivity of the small firm or office "will be improved, and the current trend toward managerial decentralization should continue into the mid-1980s," he added.

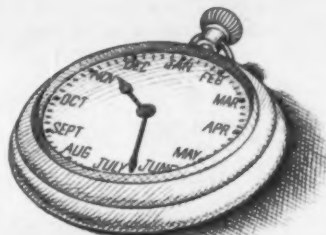
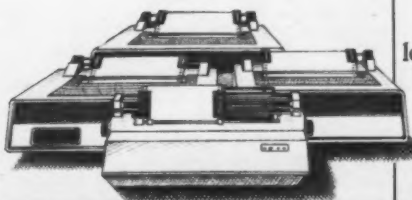
"The primary impact of the rapid and continuing growth of NIS through the '80s will be the growth of integrated systems linking vendors, suppliers, remote offices and homes. This trend should start to reverse the managerial decentralization trend of the mid-1980s as corporate management and staff link their decentralized systems through NIS."

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Growth Predicted for Portable Terminals

NORWALK, Conn. — The portable terminals market will continue its high growth rate over the next decade and, during the same time period, will open its market base to new users, International Resource Development, Inc. (IRD) stated in its recent "Portable Terminals" report.

Shipments of portable terminals will reach \$200 million, more than 10 times the 1970 figures, and another more than ten-fold increase will occur during the next 10 years with 1980 shipments exceeding \$3 billion, according to the report.

Portable terminals will also change significantly over the decade, becoming a consumer product, rather than exclusively a business or professional product, the report stated.

The report compares the broadening of the portable terminals market with the growth patterns established for calculators, two-way radios and microcomputers.

Software Offerings

Already, some suppliers of hand-held language translators are writing new software which will result in special-purpose hand-held terminals capable of various applications. According to IRD, Nixdorf Computer Corp. is planning to introduce a hand-held electronic mail terminal capable of sending and receiving written messages over a telephone line and which will cost less than \$500.

Several other firms are marketing data terminals that operate over two-

way radio channels and that can be used for inventory control, construction management and public safety applications. IRD expects shipments of portable radio data terminals to grow from less than \$5 million in 1980 to more than \$100 million by 1990.

The IRD report also profiles and provides market shares of 25 suppliers of portable terminals. The study was based on interviews with several hundred terminal users and with portable terminal suppliers.

A free table of contents and description are available for the "Portable Terminals" report, which costs \$895.

IRD is a specialized research and management consulting firm located at 30 High St., Norwalk, Conn. 06851.

Group to Study Act Rewrite

(Continued from Page 67)

industry to focus on how each area of concern would directly impact them. It is our hope that the conclusions drawn from this study group will be presented at public hearings and used by legislators to draft fair, inclusive legislation."

Asked why a study group had been formed when at least four computer industry trade groups — representing on-line service bureaus and mainframe, terminal and modem manufacturers — are already active in the debate, O'Kelley said the issues transcend the interests of any one group.

He added that sponsorship of a study group by any or all of these trade organizations would make some vendors unwilling to participate. However, the study group will maintain close liaison with all of the groups opposed to what he called "The Bell Bill."

The first meeting of the study group is planned for next month on the West Coast, O'Kelley said. Afterward, it will meet "a number of times over the summer and fall."

New Applications for Computer Technology

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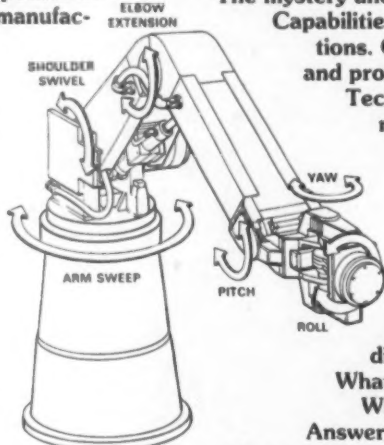
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Executive Corner

- Summagraphics Corp. has named Robert M. Dunn as vice-president, systems development.

- Claus Fuchs, deputy director, customer systems engineering, has been named an assistant vice-president of ITT World Communications, Inc.

- Thomas J. Spadafora has been named vice-president, product marketing, for the Transmission Products Division of Timeplex, Inc.

- F. William Gilmore, Denver business executive and management consultant, has been appointed president of Computer Systems, Inc.

- Tymnet, Inc. has promoted Arthur J. Caisse to vice-president of product planning.

- CGA Computer Associates announced the appointment of Robert J. Beck as head of business development and marketing.

- Richard J. Schineller, president and chief executive officer of Decision Data Computer Corp., was recently elected as a member of the company's board of directors.

- Kasper V. Cassani has been elected president IBM World Trade Europe/Middle East/Africa Corp.

- David R. A. Steadman has been elected a Raytheon Co. vice-president. He will head Intelligent Terminals Operation at Norwood, Mass.

- Dataproducts Corp. has promoted Paul D. Weiser to senior vice-president and Richard H. Ericson to vice-president in charge of the firm's Word Processing Division.

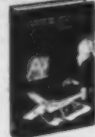
- Robert Dryden has joined Boeing Computer Service, Inc. as executive vice-president.

- ADP Network Services, Inc., has named five new vice-presidents: Donald R. Brown, Donald H. Bogert, William J. Stelma, Anthony J. DePaul and Joseph T. McCarthy.

- David A. Willis has been named vice-president-treasurer and Glen Cavanaugh has been appointed vice-president of marketing support for Datapoint Corp.

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PM123
The Computer Age: A

Twenty-Year View, edited by Michael L. Dertouzos and Joel Moses.

"Publishers Weekly" called this book "... a rare look into the next 20 years of computer development... by 20 of the computer world's top authorities. The concept of an emerging information society, as opposed to the industrial or agrarian society of old, is the underlying unity of the book. The essays range broadly across an exceptional variety of issues yet they are insightful and specific rather than merely descriptive." \$25.00

IC130 Application Design Handbook for Distributed Systems, by Robert Patrick.

An excellent handbook for the practicing systems analyst, this book is a state-of-the-art approach to the mechanics of computer application design and an organized compendium of application design hints. It's a non-mathematical treatment based on firm data processing principles, and provides basic coverage of human factors, performance, distributed data and systems availability concepts that must be considered during the evolution of a successful design. Addresses economics of distributed computing and includes a checklist of 95 activities to be considered by the designer of a distributed system. \$19.95



WJ143
Advanced ANS COBOL with Structured Programming, by Gary Brown.

This book does not deal with the elements of programming, but goes right to its task: teaching the basics of COBOL and simplifying many of COBOL's advanced features, including sort-merge, character string manipulation, report writer, indexed and direct files, communications facility and others. Emphasis is placed on structured programming as a way to simplified programming. \$24.50

BP132 Personnel Management, Sang Lee and Cary Thorp, editors.

A guide to the use of computers in personnel management. Includes a description of the nature of Personnel Information Systems, the role of time-sharing and consulting services, legal problems and more. \$15.00

JW129 Fundamentals of Data Communications, by Jerry Fitzgerald and Tom Eason.

An introductory book for people with little previous knowledge of data comm. Includes discussion of hardware, design methods, network configuration and control concepts. \$20.95



CS122
Learning Level II,

by Dr. David A. Lien.

This book covers Level II BASIC on the TRS-80, including a special section on converting Level I programs to Level II. It does not require a knowledge of Level I, however. It explores every important BASIC capability in detail, with the emphasis on learning how to use it, including the Editor, dual cassette operation, the real-time clock, printers and other peripherals. \$15.95

BP134 Data Processing Training Handbook, by Gary Slaughter.

This book addresses the reasons for justifying DP training, how to justify it, and how to measure its effectiveness. It also assesses the readiness of your DP department to move ahead with a cost-effective training program by providing you with a means of analyzing the current status of your DP operation as compared to other formal DP training programs. \$15.00

BE125 Modern Project Management, by Claude W. Burrill and Leon W. Ellsworth.

A comprehensive book about data processing application development, presenting a project methodology designed to assist all levels of management in their efforts to achieve productivity, quality and worker satisfaction. \$39.00



WJ141
Communications and Data Management, by T. Walton.

"How to establish an ideal information systems plan for your organization." This information planning handbook helps you implement an overall, long-range data management plan insuring adequate information at low costs and giving you improved performance, improved user enthusiasm and improved cost-efficiency. \$24.95

BP133 Electronic Communications Systems, William C. House, Editor.

A comprehensive group of articles on the new and exciting communication systems available through electronic means. Subjects covered include: Basic Communication Concepts, Network Fundamentals and Emerging Satellite and Packet Networks, Current Trends in Data and Word Processing, Expansion of Intelligent Terminal Networks, Key Telecommunications Applications. \$25.00



PM124
Research Directions in Software Technology, edited by Peter Wagner.

Consisting of contributions from some of the most prominent researchers in computer science today, this book assesses the past, present and future impact of computer research on the development of software technology. Emphasizes the relation between theory and practice and the reliability of increasingly complex software projects. \$24.95



CS121

The Basic Handbook, by Dr. David A. Lien, author of the TRS-80 Learner's Manual.

The publishers say that this book is an "encyclopedia of the BASIC language," that will help you "make those programs found in magazines work on your computer—or know the reason why they can't." If there is an alternate way to write a needed function that your machine doesn't have, this book will give you a subroutine to accomplish the same thing. If there is another way to write a program with different BASIC words, the book will show you how. \$14.95

BP131 Problem Solving: A Systems Approach, by Robertshaw, Mecca and Rerick.

Shows how to zero in on problems, strip them down to key issues and then resolve them, using general systems principles. Uses many examples from various fields, including data processing, to involve you in real-world problem confrontations and the use of systems tools for their solution. \$17.50

JW128 An Introduction to Programming and Problem Solving with Pascal, by Schneider, Weingart and Perlman.

This book will help you gain a firm working knowledge of the entire PASCAL language. It also teaches the fundamentals of programming in general, and an awareness of the importance of programming style. \$16.95



WJ039
Microcomputers,

by W. Chen and Y. Yokely.

Find out how microcomputers may change and their future impact on society in this "technology forecast and assessment to the Year 2000." Includes microprocessors, memory, peripherals and software. \$15.95

SC126 Computers and Social Controversy, by Thomas Logsdon.

This book examines the social consequences which the use of computers will eventually bring with it. Seven major areas are covered, including computers and privacy, crime, education, artificial intelligence, automation, consumerism and banking. \$15.95

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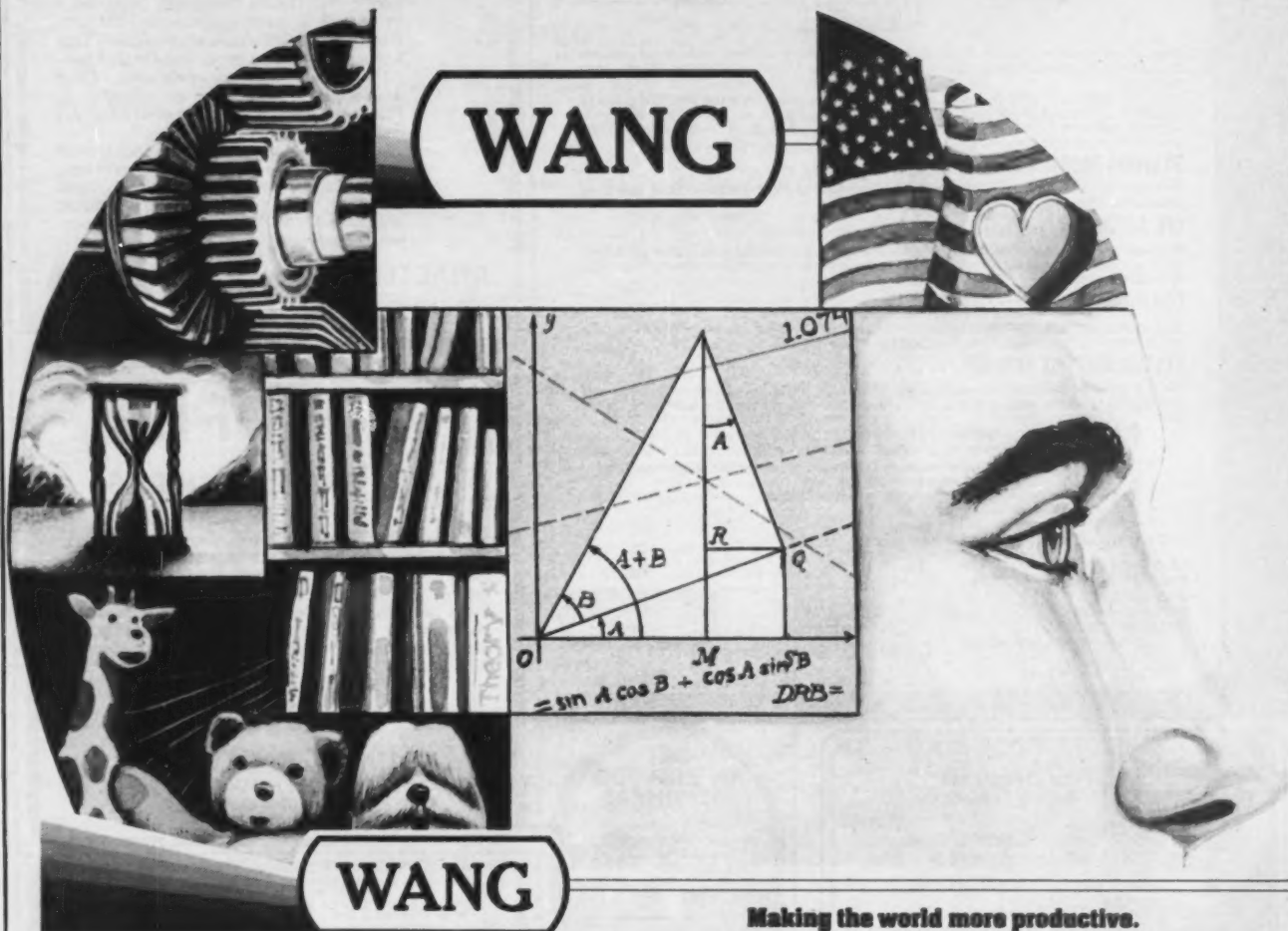
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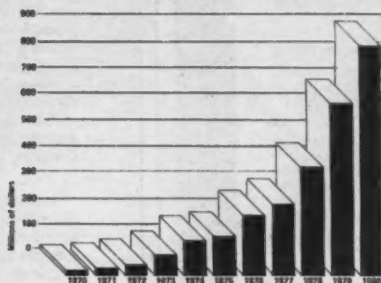
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Dyer, Wells and Associates, specialists in system development and project management services, has clients in the major insurance and financial centers of the eastern United States and Canada. Several opportunities are currently available for individuals experienced in Group Insurance systems. These positions offer exceptional potential for technical, professional and financial growth. They also offer considerable challenge to self-motivated individuals who enjoy working with other talented persons in the creation of leading-edge system solutions.

Necessary Background

In addition to insurance systems experience a strong background in one or more of the following areas is necessary.

- Recent large system project leadership.
- Application of structured methodologies to large system developments.
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Salary and other benefits are exceptionally attractive. All positions offer high visibility to top management levels of client companies and the opportunity for advancement within a small, rapidly growing professional organization. For more information please mail (confidential) resume, with salary history and statement of career objectives, to:

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You will be responsible for implementing the "Address Space Management software" on a state-of-the-art microcomputer system. BS in CS and 2 plus years of PASCAL or similar programming language required. Must have both multi-programming and operating systems programming experience.

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You will lead a team of programmers in the development of utilities and diagnostics. BS in CS and 4 years of experience in the development of software systems, and a knowledge of PASCAL required.

Systems Programmer

You will be responsible for the development of test packages for microcomputer operating systems. BS in CS and 2 years' experience in software development including verification and QA required.

Sr. Software Systems Programming Specialist

You will be responsible for the development of a display manager for an advanced microcomputer system. BS in CS and 2 years of development experience in display-oriented human interface systems. Graphics experience and PASCAL knowledge needed.

Sr. Systems Analyst

You will design and develop software diagnostic system for microcomputer system. BS in CS and 3 years in software design and development with emphasis on software diagnostics required.

Sr. Systems Development Engineer

You will perform logic design and test for disk and back up subsystem. BS EE or CS and 4 years' digital logic design experience in mainframe or minicomputer peripheral controllers. Tape or disk experience is preferred.

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You will work with other design engineers to coordinate hardware diagnostic routines. BS EE and 2 years' industrial experience, preferably in microdiagnostic programming or firmware design. Knowledge of TTL based design necessary.

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You will lead the design of external and internal packaging for an advanced computing system. BS ME and 5 years of electronic equipment packaging experience required. Must be familiar with current metal stamping and vacuum form techniques, and have prior supervisory experience.

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You will design interfaces between peripherals (CRT, Printers, etc.) and a high level microprocessor based system. BS EE and 2 years of digital circuit design experience, and familiarity in microprocessor based LSI peripheral controller, graphics or CRT design, and software experience helpful.

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Our Data Processing Department is going through a major conversion to an IBM 370/158 System. This is opening up brand-new positions that offer the unmatched excitement and challenge of developing programs from the beginning. And growing with them to successful completion.

The people we are looking for must have 2-5 years' experience installing and maintaining OS/VSI or MVS operating systems. This experience need not be with a current employer, but must be included in overall work background.

Bachelor's degree or equivalent required.

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Send resume with salary history to: Mr. Charles Francois, Corporate Personnel, Cordis Corporation, Dept. A-2, P.O. Box 370428, Miami, Florida 33137. For a brief recorded message about the past, present and future of Cordis, call toll free 800-327-7894 (from outside Florida).

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We are looking for a special individual who has experience in the management of large scale, sophisticated computer centers. This individual should have a degree in business, management, information systems, math, or engineering and a minimum of five years management experience in computer operations; a graduate degree is preferred. The ideal candidate will be experienced in capacity planning and workload analysis. The Management Services Officer will be responsible for maintaining overall security and monitoring system integrity. Salary to Low 30's.

Please call (804) 786-8413 or send resume to:
Bob Rainey, Personnel Manager
Department of Computer Services
Commonwealth of Virginia
513 5th Street Office Building
Richmond, Virginia 23219
EOE/M-F

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The Coordinator is responsible for serving the computing needs of the college. Duties include system design and generation, operation and maintenance of current applications, development of new applications, and supervision of both data services production and staff. Minimum requirements include a bachelor's degree or equivalent experience in computer science, experience and knowledge of the IBM 370 system, COBOL, command level CICS/COBOL, RPG, and ALC. Knowledge of DMS helpful. Contact Dr. James L. Taylor, Assistant to the President, Temple Junior College, 3900 South First Street, Temple, TX 76701, by June 23, 1980. An Affirmative Action/Equal Opportunity Employer.

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Applicants with demonstrated ability to deliver academic computer services, an earned doctorate, and research, teaching, and supervisory experience will receive greatest consideration.

Current systems are IBM 370/158, HP 3000, Verox Sigma 6.

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Send resume to Larry Scott, Search Committee Chairman, Director of Academic Computing, Department of Mathematical Sciences, Virginia Commonwealth University, Richmond, Virginia 23284.

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For application form, call Personnel Dept. (813) 878-7222, Ext. 230 or write to:

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Requires systems software implementation and modification experience. Must be knowledgeable of on-line interactive software packages, MVS, JES2 and/or VM/370, and experienced in performance monitoring and tuning.

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WORD PROCESSING MANAGER

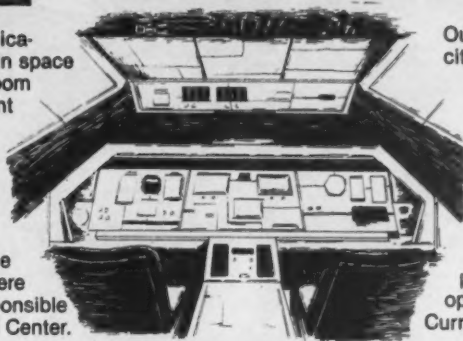
Independently manage and maintain computer based word processing system. Tasks involve creating, maintaining, and removing user accounts; managing activities of 3 to 5 operators; installing and maintaining new and upgraded software packages; allocating disk storage, etc. Conduct user classes for operators. Working knowledge of DEC's diagnostic programs for PDP family of computers. A BS in Computer Science or Engineering required. 2 years experience with RSTS operating system (V06C or above) and knowledge of the RSTS disk structure. 1 year experience with WORD-11 System including use and installation. Teach University level Computer Science courses on a part-time basis. Salary \$15,000 - \$18,000. Send resume by June 16, 1980 to A. Bachione, Tulane University Computer Lab, University Station, New Orleans, LA 70118.

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Ford Aerospace & Communications Corporation

Space Information Systems Operation



The data processing division of the MERCURY INSURANCE GROUP has immediate openings for the following positions:

SYSTEMS PROGRAMMER. 5 years experience with IBM hardware and data communications network. Responsibilities to include technical support and the maintenance of DOS/VS, DOS/VSE, VSAM, CICS/VS and other systems software. Technical support functions to include problem solving, performance analysis, configuration planning, education planning, operations planning and hardware/software recommendations.

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Qualified applicants please submit resume, including salary history and requirements to:

KATHY MERRYMAN

Director of Personnel

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Our system's current hardware and software capabilities include an IBM 3031 mainframe (6 meg core storage) under an MVS operating system with IMS Data Base on-line teleprocessing, and PCS. Our future plans are for the installation of a total patient care system with a network of up to 400 terminals, to include application areas such as ADT/Census, order entry, radiology, pharmacy and laboratories. You would coordinate, from a management standpoint, the implementation of these plans through the upgrading of hardware and the institution of software additions and enhancements.

EXPECTED QUALIFICATIONS

- BS in Computer Science, Business Adm., or a related discipline necessary; master's preferred.
- Significant (i.e., 4-5 years) background in a project management capacity in the installation of large-scale IBM patient care and hospital administrative systems in a major hospital environment
- Ability to effectively communicate both orally and in writing with all levels of staff and management.

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Steven Pearl, Personnel Manager

University of Cincinnati Computer Center
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Computer Specialist East-West Center

The East-West Center is a national educational institution founded by the U.S. Congress in 1960 to promote better relations and understanding among nations through cooperative programs of study, research, and training. Applications and nominations are being accepted for the position of Computer Specialist in the Population Institute.

Under the general supervision of the Supervisory Computer Specialist and the technical direction of appropriate research associates, the Computer Specialist will provide computer support for projects and data processing of various types of population research data. Major duties include: writing and testing application programs for data analysis; designing and preparing specifications for systems, program algorithms, file organizations, and other documents; modifying and testing existing programs for slightly different applications; providing consultative services in the use of various statistical packages to EWG graduate students and research interns; and modifying and implementing software systems developed elsewhere.

REQUIRED QUALIFICATIONS: Education — Bachelor's degree or equivalent in computer, mathematical or social science. Experience — Three years of progressively more responsible experience providing computer support in social science research. (Experience may include heavy use of major statistical and tabulation packages (e.g., SPSS, BMDP, SAS, TPL, IMSL, etc.); work with large and complicated data files, computer editing and interactive computing. Knowledge — A high level of competence in FORTRAN and PL/1; familiarity with IBM utilities; and multivariate statistics. Ability — To work and communicate effectively with computer analysts and academic staff in different social science fields and with people of diverse cultural backgrounds and to efficiently provide services to multiple projects.

PREFERRED QUALIFICATIONS: Master's degree in a related field; experience in data processing of demographic survey data; programming keypunch/verifier machines and with a variety of computer hardware; and knowledge of methods of demographic analysis and of Asian/Pacific culture and language.

Salary: \$17,035.00 per year plus cost-of-living allowance currently at 12.5% (subject to change). Submit resume with cover letter which includes title of position sought, a narrative description detailing relevance of your qualifications and background to the responsibilities of this position, and names and addresses of three professional references. Applications must be postmarked by June 27, 1980. Send to: Karen Young, Personnel Office, Dept. 523, East-West Center, 1777 East-West Road, JAB 1906, Honolulu, Hawaii 96846.

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Send resume to:

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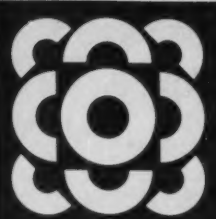
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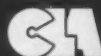
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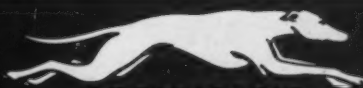
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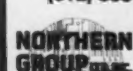
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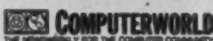
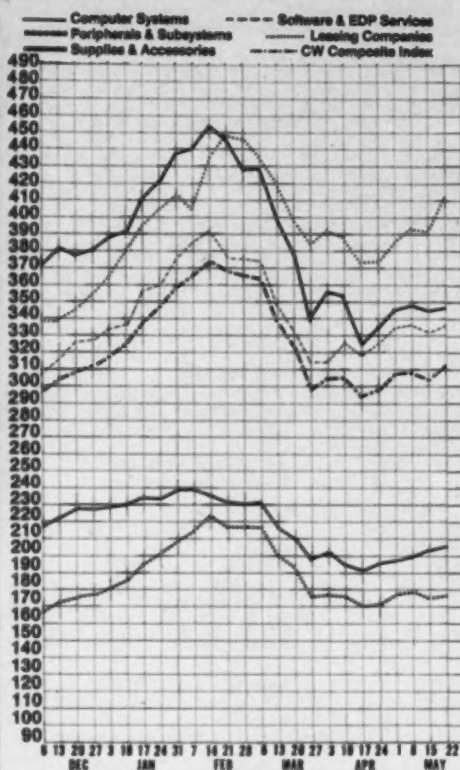
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